LIFE CYCLE COST: THE IMPACT ON THE PROCESSING OF NEW INFORMATION FOR DURABLE GOODS

By

R. BRUCE HUTTON

A DISSERTATION PRESENTED TO THE GRADUATE COUNCIL OF
THE UNIVERSITY OF FLORIDA IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

1977

ACKNOWLEDGMENTS

I am deeply indebted to a number of people for their guidance and support over the last three years. First, and foremost, is Professor William L. Wilkie, who introduced the concept of "perspective" into my life in more ways than one, who allowed me to discover a meaningful direction for my career, and who provided an atmosphere which encouraged me to work to my full capacity. His contributions and patience have far exceeded the role of major professor. Professor Joel B. Cohen stressed the importance of problem conceptualization and direction and required the methodological soundness necessary for meaningful research. Professor Grace G. Henderson provided useful insights into important problem areas and was a constant source of encouragement.

In addition to my committee, I would also like to thank Professors A. R. Wildt, Gordon Bechtel, and Olli Ahtola for their interest and incisive comments in the conceptualization of parts of this project.

A special thanks goes to Dennis McNeill, fellow graduate student and friend, whose support, encouragement, and advice have made the past three years and this project more meaningful.

I would also like to thank the National Science Foundation and the American Marketing Association for their support. An NSF grant awarded to Professor William L. Wilkie and the AMA Doctoral Dissertation Research Grant awarded to the researcher provided the flexibility necessary to make this project a more meaningful contribution.

Finally, and most importantly, it was my wife Linda who made the past three years possible. Without her encouragement, strength, and sacrifices this would not have been done. To you, Linda, go my most special thanks.

TABLE OF CONTENTS

Page

ACKNOWLEDGMENTS ii

LIST OF TABLES. vi

LIST OF FIGURES viii

ABSTRACT ix

CHAPTER

1 INTRODUCTION 1

2 GENERAL PROBLEM FRAMEWORK. 9
  Consumer Information. 10
  Durable Goods 37
  Programs and Reports Applied to Objective Information Provision 51

3 LIFE CYCLE COST. 61
  What Is The LCC Construct?. 62
  What Impacts Might LCC Have For Consumers?. 73

4 DESCRIPTION OF STUDY 84
  Impact of New Product Information: Levels of Consumer Response. . . . 84
  Focus Groups. 87
  Presentation of Hypotheses. 99
  Research Design and Control Procedures. 110
  Sampling. 113
  Conduct of the Experiment 115
  Summary 134

5 RESULTS AND DISCUSSION 135
  Analysis of Results 135
  Discussion of Results 191

6 SUMMARY, CONCLUSIONS, AND IMPLICATIONS . . . 202
  Policy Implications 203
  Implications for Future Research. . . . 214
  Conclusion. 217

TABLE OF CONTENTS (continued)

APPENDICES Page

I RESULTS FOR ENERGY COST PER YEAR PRODUCT INFORMATION. 221

II EXAMPLES OF LABELS UNDER THE VOLUNTARY LABELING PROGRAM 230

III INSTRUMENT 235

IV COST CALCULATIONS. 275

V RAW DATA AND CODING SHEET. 279

BIBLIOGRAPHY. 303

BIOGRAPHICAL SKETCH 309

LIST OF TABLES

TABLE Page

1 Perceived Product Environment for Refrigerator-Freezer Features. 77

2 Demographic Profile of Group Interview Participants 90

3 Summary of Characteristics of Refrigerator-Freezer by Order of Discussion. 92

4 Focus Group Interview Quotations. 93

5 Mean Values for Model Satisfaction Ratings. . . 138

6 MANOVA: Satisfaction Ratings 140

7 Evaluative Distance Between Energy Saving and Energy Using Models 145

8 Additional Information Consumers Would Like To Have Had. 148

9 Factors Influencing Operating Costs 149

10 Accuracy of Consumer Perceptions by Dimension . 150

11 What Cost Is Greater--Purchase Price or Lifetime Energy? 150

12 Which Is More Cost Efficient--Top Flight or Exclusive?. 153

13 Considerations in Evaluation of What Attributes to Include. 155

14 Cost Recall and Recognition Summing Over Features. 159

15 Feature Evaluation. 162

LIST OF TABLES (continued)

TABLE Page

16 Building Task 164

17 Consumer Evaluation of Cost Information 166

18 Two-Way ANOVA: Perceptions of Purchase Price . . 170

19 Two-Way ANOVA: Perceptions of Operating Cost . . 170

20 Two-Way ANOVA: Helpfulness of Cost Information . 171

21 Two-Way ANOVA: Complexity of Cost Information. . 173

22 Percentages of Consumers Judging Cost Information "Simple" 173

23 One-Way ANOVA: Effect of Education on MAD's. . . 176

24 Feature Costs and Mean Absolute Deviations. . . . 178

25 Model Satisfaction Mean Values by Educational Level 182

26 MANOVA: Model Satisfaction 184

27 Correlation Analysis on Demographics. 186

28 Partial Correlation Analysis on Selected Demographics. 187

29 Partial Correlation Analyses on Consumer Evaluations 189

LIST OF FIGURES

FIGURE Page

1 Estimated Breakdown of Electrical Energy Use by the Residential Sector for 1967 50

2 Components of 1972 Discounted Life Cycle Costs for Refrigerator-Freezers 50

3 Conduct of the Experiment Flow Chart. 117

4 Model Satisfaction by Information Level 139

5 Mean Values for Model Satisfaction. 183

Abstract of Dissertation Presented to the Graduate Council
of the University of Florida in Partial Fulfillment
of the Requirements for the Degree of Doctor of Philosophy

LIFE CYCLE COST: THE IMPACT ON THE PROCESSING OF NEW INFORMATION FOR DURABLE GOODS

By

R. Bruce Hutton

March, 1977

Chairman: William L. Wilkie
Major Department: Marketing

The purpose of this dissertation is to increase understanding of the impact on consumers' processing of new product information. Specifically, this research study focuses on objective product information including price, energy, and service costs presented as components of a newly organized index--life cycle cost (LCC). LCC is defined as the sum of all dollars paid for an "average" product during its useful life. In essence, LCC provides consumers with a more comprehensive, organized, and consistent way of dealing with product cost by incorporating the three components within a consistent time frame (average product life) and common units of measurement (dollars). Consequently, this project addresses important issues that necessarily underlie the potential information provision impact at the more traditional brand choice and market share levels. Attention focuses on the individual and his reaction to this new form of product information.

A major point in this study is that impact of information can, and should, be measured in a variety of ways, especially in assessing impact of new forms of product information. Impacts that would prove crucial to an information provision involving LCC include (1) increased information in the marketplace leading to more informed consumers, (2) improved conceptualization of product cost to include both acquisition and operating costs including a longer run perspective of product cost, (3) increased salience of energy and service as cost dimensions of a product, (4) improved bases for consumer evaluation of alternatives, (5) sharpened cost/benefit judgments on product features, (6) new trade-offs between initial and deferred costs reflected by trade-offs among the primary components of LCC, and (7) shifts in products purchased.

Hypotheses were set up to test different levels of consumer response. Among them were consumer awareness and accuracy regarding product cost perceptions, recognition and recall, helpfulness and complexity in evaluating alternatives, consumer attitudes and satisfaction, and measures approximating purchase behavior. The effects of relevant demographic variables were also assessed.

The basic design was a posttest-only control group design with three conditions--LCC information, energy/year information, and the control group receiving only price. The sample was composed of housewives of varying demographic

profiles. The experiment consisted of multiple tasks including a simulated "building" task designed to allow subjects to "build" the refrigerator-freezer that best suited the needs and budget of their family.

Strongest results are seen in hypotheses reflecting levels of consumer response in a cognitive as opposed to a behavioral sense. Support was found for the premise that availability of objective information will lead to more informed consumers. In a key finding concerning the interaction between price and energy costs, the LCC group was more accurate in perceiving the correct relationship (i.e., energy costs account for a higher percentage of total product cost). Also, the control group significantly underestimated the magnitude of operating costs for a given price.

Findings concerning the most effective way to present such information are equivocal. Consumers currently prefer energy/year data, but there is some evidence that the LCC index may be more efficient.

Results also indicate a changing conceptualization of product cost with the availability of LCC (subjects in LCC condition correctly perceived electricity as costing more than purchase price over the life of the product). Also, the presentation of cost data is most effective when given as actual figures rather than semantically. Consumers indicated a favorable attitude toward energy savings features, but those that had data to make trade-offs between price and energy were more likely to choose to purchase such features.

Overall, evidence indicates that consumers' existing knowledge in the energy area and its relation to products and other costs is lacking. It is apparent that some cost information in addition to the traditional price data is desirable.

CHAPTER 1

INTRODUCTION

In recent years, concern with the amount and type of information available to consumers for product evaluation has been increasing. Arguments in favor of, and against, requiring the provision of performance data (i.e., objective information) for various product classes from cereals to air conditioners have been advanced by consumer groups, marketers, public policymakers, and consumer researchers. Despite the wide variations in opinion, it appears certain that there will be an increase in the disclosures of efficiency and comparative performance data in the future (Day, 1976).

The major issues then surround provision of the most "effective" information for the various product classes. The less than satisfying results of past information programs (truth-in-lending, unit pricing, cigarette warning labels) point to the potential contributions of research evaluating consumer response (i.e., impact) to any new objective information provisions. Such research may contribute to the selection of the information most needed by the consumer with regards to a product class and in evaluating program "effectiveness."

Consequently, this dissertation is aimed at increasing our understanding of consumer information processing (CIP) as it relates to new forms of product information. More specifically, the "life cycle cost" measure developed in the M.I.T. Report, "The Productivity of Servicing Consumer Durable Products," will be examined. This measure extends beyond the newly required energy labels in that it provides a comprehensive and consistent framework for three cost dimensions--price, energy, and service. In addition, the study is structured to allow analysis of the energy information alone. Emphasis will be placed on the various features available within one durable product--refrigerator-freezers. Summarizing, the primary consumer research issue to be addressed in this dissertation is the impact of the life cycle ocst (LCC) construct on consumer response to information pertaining to durables, specifically refrigerator-freezers and associated product features.

The contributions of this thesis will be most directly applicable to marketing's interface with public policy programs for objective information provision, marketing management, and to the development of CIP research. First, the thesis is directed toward durable goods which have received considerably less attention than packaged items in previous research. Second, marketers are continually evaluating the impact of information including ads, package designs, labels, promotions, etc. Policymakers are also concerned with the impact of information on the consumer. Many of these studies utilize only attitudinal type measures and/or market share shifts for evaluation purposes. This dissertation attempts to develop and use measures which allow for evaluation of information and its impact in a more comprehensive light and which can contribute to strategic development of stimuli targeted for future objective information provisions. Third, little empirical work has been done exploring the relationship between energy use and consumer behavior in a product sense. Finally, in order to increase both internal and external validity, housewives were used as subjects, and the methodology involved a task designed to allow the consumer to create the refrigerator-freezer which best suits his needs and budget. It is hoped that this task will improve on the more traditional written questions by reducing both real and perceived emphasis on cost components, and thereby provide truer subject responses to available information.

The dissertation will be divided into six chapters. Following the Introduction, Chapter 2 will discuss the General Problem Framework. Basically, this chapter is concerned with consumers' present and future information environment. The concept of consumer information is a complex one. Providing information to the consumer has long been recognized as an important function of marketing management, and in recent years government at various levels and consumer advocates have also become increasingly concerned. Primary issues involve consumer awareness, interest, understanding, and utilization of facts pertinent to the purchase and use of products offered by today's marketing system (Wilkie, 1975a). In order to discuss this within the context of the focus of this dissertation, the chapter will be broken down into three sections--consumer information, durable goods, and relevant programs and reports.

First, the pros and cons of the current consumer information environment are given in terms of its adequacy for consumer evaluation and decision making. The main concern of those who feel it is not adequate is the perceived lack of information, especially objective data. Because of the complexity of the issue and the divergent opinions regarding solutions, consumer research implications are discussed next. Consumer research, and subsequently consumer information processing research, has the capacity to play a vital role in the area. CIP research can provide assistance in the selection of relevant information, and it can help in improving the effectiveness by which the information can be communicated through the use of more valid research designs with greater generalizability.

The basic problems within the area will be highlighted in a discussion of past research and conceptual articles, including impact studies of unit pricing, truth-in-lending, nutrition, and energy and a description of the Voluntary Labeling Program, Energy Policy and Conservation Act, and the M.I.T. Report. In all cases, a consistency of concern with two underlying issues is present--a determination of what is relevant for the consumer and the criteria for determining such information.

Relating the concept of consumer information more closely to this study, Chapter 2 ties the importance of information to durable goods and especially refrigerator-freezers. A major point is that the value of information is related to risk, stored information and past experience, and character of available alternatives. The purchase of a durable good such as a refrigerator-freezer involves all these factors. In addition, it is pointed out that the refrigerator-freezer is a major energy consumer.

The costs involved in major durable goods are the focus of Chapter 3, Life Cycle Cost. The definition of life cycle cost (LCC) supplied by the M.I.T. Report (1974) is the total dollars the consumer will expend over the product's useful life. Major costs involved are price, energy, and service expenses. Both the concept and its components are discussed. Price is probably the most obvious cost involved in the purchase of most products of this nature. It is also likely that consumers are aware of energy and service costs, but it is equally likely they will not be aware of the magnitude and importance of such factors over the product's life. It is suggested that the availability of LCC data may cause a changing conceptualization of product cost and provide a new basis for evaluating products. In addition, specific impacts which LCC might have on consumers include:

1. Increased information in the marketplace leading to more informed consumers.
2. Improved conceptualization of product cost.
3. Increased salience of energy and service as cost dimensions of a product.
4. Improved basis for consumer evaluation of alternatives.
5. Sharpened cost/benefit judgments on product features.
6. New trade-offs between initial and deferred costs.
7. Shifts in products purchased.

The purpose of Chapter 4, Description of Study, is to translate the general problem framework of Chapters 2 and 3 into a research format for testing the impact of new product information on consumers. The initial discussion centers around the fact that impact may be measured in a variety of ways, and changes in attitudes and market shares are not the only relevant criteria for evaluation of impact. The purpose of this study is to look at the impact of new product information using a variety of measures, including understanding, liking, recall, and utilizations.

In order to gain a better understanding of the current environment, focus group interviews were conducted with housewives in the Gainesville, Florida, area. The purposes were to explore the current state of consumer knowledge and attitudes toward refrigerator-freezers, to gain a better understanding of the language used, and to increase understanding in the area of cognitive complexity with regard to consumer views of dimensions of refrigerator-freezers. The results of the focus group interviews coupled with the general problem framework of Chapters 2 and 3 provide the basis for the hypotheses to be tested which are then discussed.

After the presentation of hypotheses, a discussion of the research design, sampling, and control procedures is given. A posttest-only control group design, one of three true experimental designs discussed by Campbell and Stanley (1963), is utilized. The three groups to be tested are LCC, energy/year, and control. The LCC group will receive information of the variety discussed in Chapter 3. It represents the most comprehensive and unique presentation of cost data. The control group will receive only price information which approaches the information environment as it exists today. The third group is an energy/year condition which was included because of the upcoming implementation of the requirement of such data for refrigerator-freezers in the near future. Consequently, the analysis focuses on LCC v control, while energy/year results are discussed in an appendix.

The rest of Chapter 4 involves a discussion of the conduct of the experiment. This is felt to be an important part of this study for two reasons. First, the study measures impact at various levels so that the sequence of events in the experiment becomes crucial. Second, the implementation of measures and formats which can be used as valid indicators of information impact will aid in the development of future evaluative techniques.

While Chapter 4 provides an in-depth look at the conduct of the experiment and presents the hypotheses to be tested, Chapter 5, Results and Discussion, discusses the results of the tests. They are presented in two frameworks. First is the extent to which each hypothesis is supported. Second is a discussion of results by the level of consumer response measured.

Chapter 6, Summary, Conclusions, and Implications, focuses on the overall conclusions of the dissertation. Special attention is paid to the public policy implications of the study and to future research considerations.

CHAPTER 2

GENERAL PROBLEM FRAMEWORK

Providing information to consumers has long been recognized as an important function of marketing management. The impact on consumers of various types of advertising and promotional efforts (media ads, package design, labels, etc.) is reflected in company and product recognition, dollar sales, and profit figures. Among the factors of importance to be considered by management in the implementation of an information program are awareness, comprehension, recall, and utilization of the information by consumers in the development and change of attitudes and behavior towards products and brands.

Government, at various levels, is also becoming increasingly concerned with product information. Much of the recent legislative action proposed and implemented in the interest of consumers has been informational in nature (e.g., Truth-in-Lending, Truth-in-Packaging, unit pricing), and more such action on the part of government agencies and Congress is expected. Once again, much of the concern lies with the impact of information on the consumer. That is, the test of the societal value of such information oriented legislation is seen to rest largely on the impact of the disclosures on consumers and subsequent reactions by the business community (Wilkie, 1975a).

The purpose of this dissertation is to increase our understanding of the impact on consumers' processing of new product information. More specifically, research will focus on objective product information including price, energy, and service costs presented as components of a newly organized index--"life cycle cost" (LCC). In essence, "life cycle cost" (LCC) provides the consumer with an organized and consistent way of dealing with product cost by incorporating the three cost components within a consistent time frame (average product life) and common units of measurement (dollars). Consequently, both conceptually and empirically, this dissertation will be addressing important issues that necessarily underlie the potential information provision impact at the more traditional brand choice and market share levels. That is, attention will be on the individual and his reaction to this new form of product information--life cycle cost (LCC).

Consumer Information

Interest in consumer information programs has increased markedly in the last few years. Among those groups which have shown an increasing interest in provision of more and different kinds of consumer information are consumer advocates, marketers, public policy makers, and consumer researchers. Within these groups, the basic issue involves consumer awareness and interest, understanding, and utilization of facts pertinent to purchase and use of products offered by today's competitive marketing system (Wilkie, 1975a).

Current Information Environment Perceptions

Opinion concerning the current information environment in terms of its adequacy for consumer product knowledge and evaluation varies a great deal. Two important contributors to this variance seem to be the emotional nature surrounding the issue of information provision itself and a lack of systematic and objective research in the area. At this time, convincing arguments can be made for increasing the amount and types of information and in defense of the current environment. Within this general problem of information provision, the present emphasis is a move to provide consumers with "significant" performance data (i.e., objective information) for complicated products. Legislative support for this type of action is growing (Advertising Age, 1975). Consequently, the emphasis in this dissertation with regard to potential information provisions will concentrate on such "objective" type information.

Objective information may be distinguished from subjective information in an evaluative as well as descriptive sense (Engel, Kollat, and Blackwell, 1973). They note that evaluative criteria may be either objective (specific physical features) or subjective (symbolic values or benefits). In this case, energy and service costs and price are objective dimensions. Wilkie (1975a) reports that it is likely that consumer information programs will stress such objective and/or performance characteristics since they are the most susceptible to standardization.

Defenders of the current environment base a large part of their arguments on the economic efficiencies of our competitive marketing system. They point out that the value of information for a product category, in an economic sense, depends on the extent to which consumers can be expected to make "better" (i.e., more informed) choices with the new information than without it. Wilkie (1975b) notes that general industry and policy experience has shown many more failures than successes along these criteria in the introduction of new dimensions of consumer information. Cases in point include Ford's move to sell automobiles on the basis of greater safety in the 1950's and the health warnings on cigarettes. Further, it is argued that the present competitive marketing system is structured to provide those dimensions of product information most in demand by the consuming public. That is, when consumers want objective information regarding particular product classes, their desires will be reflected in the marketplace, and manufacturers will respond in kind.

On the other hand, an article by Lenahan et al. (1973) on nutritional labeling suggests that there are several non-use benefits which can be derived from such objective information programs:

(1) Providing a new basis for product competition,

(2) Greater consumer awareness of the objective information through advertising,

(3) Improved consumer feelings toward the industry, and

(4) Changing emphasis toward functional aspects by the industry.

The conclusions of Lenahan et al. support the position taken by Bymers (1972) in her classic article advocating that the use the consumers make of the information is peripheral to the main issue of his right to know. This premise is the result of the general conclusion that in today's product information environment, consumer decisions are forced to be based on nonfunctional characteristics (i.e., attributes not directly related to product quality). Scitovsky (1950) pointed out that the bulk of advertised messages contain very little relevant information, and, as a result, consumers are by and large "ignorant." The point is further advanced by Bymers in her conclusion that advertising seldom helps the poorly informed buyer because its content is usually suggestive, irrational, and repetitive. The general recommendation from this group is that information should be provided which has the ability to produce more informed consumers (i.e., defined by Nourse and Anderson in their 1973 article as buyers who can make more intelligent purchase decisions when provided with objective, factual information on the contents and/or performance characteristics of competing products).

Concern with the lack of information available to consumers has also gained the increasing attention of government agencies. Currently, there are at least 34 federal agencies and many state and local ones involved in disseminating consumer information and consumer education programs (Wilkie, 1975a), including the Food and Drug Administration (FDA), Department of Transportation (DOT), and Federal Trade Commission (FTC). Public policy programs in this area span a variety of interests including cigarette warnings, truth-in-lending, unit pricing, car mileage, truth-in-packaging, octane ratings, energy consumption, and nutritional labeling.

It seems certain that programs dealing with consumer information will continue to expand. This is particularly true in the case of the FTC whose basic mandate is to provide a fair and competitive environment, and who has begun to interpret its responsibility to include the initiation of information programs (i.e., proaction) rather than the more traditional reaction to isolated marketing abuses (i.e., cease and desist orders, corrective ads). Through vehicles such as the trade regulation rule (TRR), an agency such as the FTC has the power to set guidelines on trade practices for all marketers in a given industry or product category. This type of power seems particularly applicable to cases involving objective information provisions.

Consumer Research Implications

Because of the concern with consumers and product information increasing in importance at the above-mentioned levels, the interest of consumer researchers in this area is a natural one. It is generally recognized that many of the past public policy information programs, while providing valuable information to the public, have met with less than hoped for success in terms of consumer response to the information (e.g., cigarette warnings, truth-in-lending, unit pricing). The less than satisfying results of past programs may partially reflect a lack of concern or commitment with understanding the individual consumer. Consumer research can provide valuable insight into consumers' response to various forms and types of product information before program implementation. One of the premises of early programs has been that "clear and conspicuous" disclosure was adequate for achieving policy objectives. This reflects the policymaker's concern with the stimulus (i.e., information) and subsequent response (i.e., usually measures such as brand choice or market share shifts). It is generally recognized that this S-R framework is not totally adequate. In fact, one needs to consider those consumer characteristics which differentiate individuals in terms of their reaction to the stimulus (S-O-R framework). In this regard, research involving consumer information processing (CIP) is a particularly applicable tool.

Besides the concern with the individual as a unit of study, the relevance of CIP to information provision, especially in a policy sense, is further enhanced because it provides the opportunity to evaluate consumer response (i.e., impact) to new product information with criteria other than brand choice or market share measures. CIP primarily deals with brands and the bases upon which such brands are evaluated. Since policy programs for information provision are implemented to provide objective basis for brand or model evaluation, one can delineate three components of the CIP system that are particularly relevant--dimensions of consumer information, ratings or values on these dimensions, and relational rules or conceptual structures that govern the evaluation process (Wilkie, 1975a). Chaffee and McLeod

(1973) have represented these components in the matrix form:

	BRANDS			
ATTRIBUTES	A	B	C	SUMMARY ATTRIBUTE EVALUATION
1	A_1	B_1	C_1	1s
2	A_2	B_2	C_2	2s
3	A_3	B_3	C_3	3s
SUMMARY BRAND EVALUATION	A_s	B_s	C_s	

Brands (or models of the same brand) and attributes comprise the dimensions, cell entries are the ratings, and relational rules provide structure for dealing with brand/attribute combinations by directing the sequence of processing activities and evaluation. Since primary concern of this dissertation is in the study of consumer response to the objective nature of information regarding product attributes, the consumer information processing (CIP) framework provides an efficient structure for exploration.

General benefits of CIP research in the area of new product information provisions can be summarized as follows:

(1) providing assistance in the selection of relevant information needed by consumers,

(2) improving the effectiveness by which such information is communicated,

(3) providing greater generalizability through research concerning consumers' utilization of information, and

(4) providing valid research designs, methods, and measurements. (Wilkie, 1975a)

The concept of relevant information and criteria

One of the basic problems in this area involves how to conceptualize the idea of adequate or relevant information so as to develop the needed criteria to assure that such information is available to the consumer. Howard (1972) lists four criteria for deciding whether information to the consumer is adequate--truthfulness, intelligibility, relevance, and completeness. In his article Howard reports that there is general agreement among parties (i.e., consumers, industry, government) that consumer information should be truthful. Also, the concept of an intelligible message is in the best interests of all parties. Consequently, his major concerns lie with the latter two dimensions and are summarized below.

The determination of what information is _relevant_ to consumers depends on how the consumer conceptualizes the object the information focuses on. Howard's concern is at the brand level, but the criteria can also be applied to the product class level as well. The consumer may conceptualize the product or brand in _denotive_ (i.e., descriptive) as well as _evaluative_ terms. A summary of the denotive dimensions is "brand comprehension." These dimensions are not numerous because the consumer is limited by his capacity to process information. The evaluative dimensions are those factors that cause him to decide whether the object is "good" or "bad." It is the combination of these dimensions that form the brand or product concept. Information is relevant whenever it aids the consumer in placing the object on the dimensions of the concept.

In his discussion of completeness, Howard's central question is concerned with determining when the consumer has enough information. Psychologically, one can think of this as occurring when the tension caused by the conflict, which is in turn produced by consumer uncertainty, is at some acceptable level. A construct that describes this psychological state is confidence in judging product quality. Howard postulates that when the consumer has received adequate information his confidence will be high and that one can conclude, in a subjective sense, his information is complete.

In analyzing the above premise, it is logical that when a consumer receives "adequate" information his confidence should be high. However, the consumer may also express a high confidence in his choice and not have received full information. The case of durable goods, and specifically refrigerator-freezers, provides an example. It is possible that consumers choose brands and models of refrigerators-freezers with no awareness or comprehension of the energy and service costs involved in operating such a product. This behavior, in part, is a function of an information environment that provides price as the only cost component for evaluation. It should not be surprising to find that, in a survey, consumers would express confidence in their knowledge and choice of a particular model. The issue then is really what information the consumer has used in his evaluation as well as his confidence in using it.

Factors that affect consumer evaluation of product features, and subsequently one's confidence, include source credibility and the salience of evaluative dimensions. This contention is supported in an experimental study by Hempel (1966) who found the influence of informational cues to be a function of both the source and content of communications.

Howard goes on to note that certain evaluative dimensions are more important or salient than others. He postulates that the consumer will select information concerning the more salient dimensions in preference to that about the less salient dimensions. He concludes that the quantity of information is basically the amount of relevant descriptive and evaluative dimensions on which the consumer has received data. Confidence, then, is a function of brand (product) comprehension and evaluative information taken into long-term memory and weighted by source credibility and salience of the dimension.

The idea of salience is a particularly important one in the case of durable products and their relation to energy and service cost dimensions. It is possible that these are not salient dimensions because consumers have not received information about them in the past that would indicate their importance. Consequently, in some cases it may take the availability of information to create salience rather than just providing information on dimensions that are already perceived as important.

An article by Jacoby (1974) discusses the shortcomings of approaches whose concern is mainly with the information and not its effects. He says that factors such as intelligibility, completeness, relevancy, etc. developed as criteria for optimal conditions of choice are concerned with the evaluation of the information, with little concern for what *effects* this information has on the consumer. Therefore, Jacoby argues, developing criteria for evaluating the information from the source is really secondary to considering the impact that such information has on the consumer. It is not *what* is provided by the source but rather *how* it is perceived and its *effect* on the consumer that should be the major focus of the information issue.

One of Jacoby's major criticisms of Howard's framework is in the area of completeness. The idea of completeness of information closely correlates with that of "full disclosure" of product information, a direction the FTC is moving increasingly toward. Jacoby notes that terms such as full disclosure and completeness are imprecise, and the concern should really be with how full a disclosure should be made for the consumer's own sake. That is, is it possible to have too full a disclosure (i.e., can the information be too complete)?

The concept of information overload and its effects on consumers has been a major focus of Jacoby's CIP research (Jacoby, Speller, and Kohn, 1974a; Jacoby, Speller, and Kohn, 1974b; Jacoby, Speller, and Berning, 1974; Jacoby, Speller, and Busato-Schach, 1974). The basis for much of his research lies in the well-documented finding in information processing research that there are finite limits to the ability of consumers to process information in a particular time period. Once these limits are passed, behavior tends to become confused and dysfunctional. The implication for consumer information is that providing too complete an information package may be just as inefficient as not providing enough. A study by Nourse and Anderson (1973), for example, found that carpet purchases have a low threshold for the quantity of label data they will use, and if there is too much information at least some will ignore all of it.

These findings could be taken as a criticism of the full disclosure concept if consumers were forced to deal with all information provided. However, Jacoby goes on to say that there is now evidence that consumers react to what may be too much information by tuning part of it out (Jacoby, Kohn, and Speller, 1973). Jacoby uses this as a criticism of full disclosure since people will not deal with all of it. However, he is failing to take into account individual difference factors here. That is, the real issue is that given a large amount of information to deal with, consumers will act selectively in determining what information they choose to deal with. What information the consumer chooses will be a function of prior information (Ross, 1972) and the saliency of the information dimensions. The rest can be expected to be ignored. The point being that consumers differ with regard to both these dimensions--so their behavior regarding the information will also differ.

Naturally, however, as Jacoby points out there are inefficiencies in providing total information. It would appear that policy makers and consumer advocates would pay more attention to a consideration of just what information should be presented and how it can be best organized.

In order to engage in meaningful research in determining the impact of information on consumers, Jacoby argues for the generation of appropriate dependent and independent variables. Possible independent variables might include:

(1) Display density--number of visual targets relative to the amount of available space.

(2) Fill--amount of nonrelevant information in the display.

(3) Complexity-symmetry.

(4) Noise and distortion--nonclarity in the transmission and reception due to physical factors.

(5) Memory load--amount of prior relevant information retained in the system.

(6) Symbolic value of the information.

(7) Preference value for information.

Dependent measures which can be used to determine how information impacts on consumers may be defined at different levels of consumer behavior. For example, possible dependent variables may be the stages in Lavidge and Steiner's hierarchy of effects model (Lavidge and Steiner, 1961). The stages are awareness, knowledge, liking, preference, conviction, and purchase. In this way, the impact of product information is being measured more completely than just through the more traditional attitude and/or purchase behavior stages. Other variables correlating with this framework include attention, interest, desire, comprehension, intention, and action. Other models of consumer decision processes which could provide dependent measures include the "AIDA" model (Strong, 1925) and the innovation-adoption model (Rogers, 1962).

The type of information involved will affect the impact seen at each of the stages. For example, Day (1976) notes that observed impact of new product information will be greatest at the initial stages of the hierarchy. As consumers become more familiar with the information over time and with experience, impact will increase in the latter stages. However, relatively little research has been done on these early stages.

Thorelli (1971) maintains that the awareness stage needs to be a focus of concentration in evaluating the impact of information provisions. There is empirical support that market information and search activity and data source awareness are highly unevenly distributed among consumer groups. His conclusion is there needs to be a diversification of consumer information across a variety of sources and media. In this way the probability of consumers becoming aware of information will increase. A study by Newman and Staelin (1972) support Thorelli. They concluded that the amount of information sought by many buyers is small, even though the information is accessible, suggesting there is substantial selectivity of search. This does not necessarily mean he is ill-informed. He may have started out with what he regarded as adequate knowledge. Herein, however, lies the problem. Because the consumer feels he already has adequate knowledge, he does not engage in information search.

This kind of procedure inhibits consumer awareness of new product information.

Even if consumers are cognizant of the relationship between products and dimensions such as energy, they may not know how useful it can be in a product evaluation sense. Bymers (1972) asserts that economists have research the variable "knowledge" least often of any of the other stages of consumer decision making. She goes on to say that almost no effort on the part of economists has been devoted to studying either the content of the information or whether what has been transferred has been understood. Instead, they work under the assumption that information availability equates with comprehension. She goes on to claim that advertising seldom helps the poorly informed buyer because its content is, in general, suggestive, irrational, and repetitive. This claim is supported by Scitovsky (1950) who says that the bulk of advertised messages contains very little relevant information.

The result of the failure to concentrate on the early cognitive stages is a mistake according to Bymers (1972). She notes that one may legislate such information as nutritionally factual labels, but this will not accomplish the purpose of improving the level of competition in the marketplace if the public does not comprehend the information. Consumer education appears essential in this area.

Mittelstaedt (1972) notes that the provision of useful information is a significant form of consumer protection. However, the value of such information in the eyes of the consumer is a function of the expected opportunity loss of suboptimal choice. The question, of course, then becomes what is an optimal choice? Mittelstaedt maintains that optimality is an individual variable, and, therefore, the ultimate judge of the value of the information should be the consumer.

However, Swan (1969) makes the point that consumers' evaluation of new information and ultimately the products involved is dependent, to a large extent, on past experience and information. He found that experience with a brand and satisfactory (as opposed to optimal) choice strategies can lead to lower information seeking. His study suggests that in the evaluative stage of products consumers may substitute prior experience for external information seeking if they have learned that certain brands are satisfactory.

Consequently, consumer liking and preference for brands may be narrowed to those they are most familiar with. If the liking and preference for a given brand translates to a conviction that it would be a wise choice, the processing of new product information would almost certainly be impeded.

The most advanced measure for evaluating new product information impact, and consequently the most difficult to show change in, is purchase behavior. Day (1976) attributes the lack of evidence of behavioral effects of information disclosures to four factors: (1) newness of the requirements, (2) problems in designing evaluation research, (3) lack of a conceptual basis for understanding how consumers use information, and (4) a lack of policy objectives. He also cites three reasons why behavior change may not occur with the information disclosures--buyers may not have a choice, previous choice may have been correct, or information may not be relevant.

Information impact: The cases of unit pricing, truth-in-lending, nutrition, and energy

Three areas which have been a major focus of information disclosure are unit pricing, truth-in-lending, and nutrition. More recently there has been a growing concern with energy. A summary of the research in each of these areas provides a framework for understanding the problems, prospects and reactions of consumers to information provisions.

Truth-in-packaging and pricing of products in the American marketplace has long been a subject of controversy resulting in the 1966 Fair Packaging and Labeling Act.

The basic issue is alleged consumer confusion in making price comparisons (Gatewood and Perloff, 1973). The argument for unit pricing is that it will eliminate such confusion brought on by price calculations.

A good review of the unit pricing literature can be found in Russo, Krieser, and Miyashita (1975). They note that in spite of the plausibility of the reasoning behind unit pricing, empirical research on its effects have been inconclusive. For example, Monroe and LaPlaca (1972) report mixed results in awareness of unit pricing. Isakson and Maurizi (1973) found that changes in purchasing patterns varied by consumer group. The prime beneficiary of unit pricing is not, as was expected, low income consumers or even high income consumers because of their corresponding high education. Rather it was middle income consumers. In fact, all consumers were influenced by the price information, but the middle income groups benefited most.

While studies by Gatewood and Perloff (1973) and Houston (1972) also found support for unit pricing in that the displaying of the data on shelf tags significantly decreased the number of errors in choosing the cheapest product, Russo et al. (1975) note that the majority of evidence indicates that unit pricing has little effect on consumer behavior.

They contended that the mere availability of unit price information was not sufficient. Rather a convenient processable display of the information was also necessary before consumers could effectively use such information. Therefore, the question they addressed concerned how to present price information in order to maximize its use. Three methods of presenting price information were considered--raw price by brand/size, unit prices on shelf tags, and an organized list of all raw prices and their corresponding unit prices, the latter method being the one hypothesized to be the most effective. The hypothesis tested was that there would be an inverse relationship between the order of the unit prices and the order of the purchasing changes as a result of the unit price lists. A large chain supermarket was used as the focus of study. The first three weeks were used to estimate a baseline distribution of market shares for three product classes--dishwashing liquid, canned dog food, and facial tissue--with the availability of shelf tag unit prices. In the next two weeks, the distribution of market shares was again recorded, but the unit price lists were now used. Results supported the hypothesis that an organized list of unit price information would alter consumers' purchasing patterns.

Another concept which has received a great deal of attention in terms of its impact on consumers is truth-in-lending information. Truth-in-lending was implemented on

July 9, 1969, with the expectation that improving consumer knowledge of annual percentage rates (APR) and dollar finance charges associated with consumer credit purchases would lead to more informed credit decisions.

An excellent article by Day and Brandt (1974) evaluates the impact of truth-in-lending. Their results showed that truth-in-lending information had little effect on credit search and usage behavior. They conclude that to simply provide consumers with more information is not enough. In fact, it is only the first step in a major educational task of getting consumers to understand the information and persuade them to use it.

Once again usage behavior has been selected as the criterion to determine the impact of the information. Although behavior change measures have not shown the expected impact of the information, there is evidence that consumers are responding to the new information. A more recent article by Brandt, Day, and Deutscher (1975) reports that a series of studies have found that consumer knowledge about APR's has risen significantly, with the greatest gains among the more affluent, better educated, and more experienced consumers.

However, they go on to report that the majority of consumers remain uninformed about interest rates. In addition, the present aggregate level of knowledge appears to be quite stable. That is, those consumers who become informed are offset by those who forget or become confused. Also, knowledge about dollar finance charges is even lower. An interesting finding in this area is that consumers with lower incomes and education are more likely to know the finance charges for a purchase. This may be due to the fact that they have to be more dollar conscious or that they engage in financing more often. The conclusion is that learning about such information formulates over time with continued exposure to the information. It is clear that studies such as this, dealing with consumer knowledge as opposed to purchase behavior exclusively, provide greater insight into the effects of information provision.

A newer area of information provision is concerned with nutrition. The thrust of information disclosure in this area is to aid understanding and eliminate confusion in consumer product evaluation of foodstuffs and their nutritional content. The underlying assumptions in this area, as in most other information programs, are the consumer has the right to be informed and that effective information dissemination can be accomplished with more specific labeling standards (French and Barksdale, 1974).

The effects of labeling regulations in the nutritional area are defined by French and Barksdale (1974) as facilitating value comparisons and aiding shoppers in making choices among brands. Ideally, information usage and subsequent purchase behavior will shift demand toward more nutritious products, and firms with less nutritious products will be forced to upgrade their products or lower price.

However, a number of problems are recognized in the nutritional information area. First, choices based on the nutritional data are unlikely to be realized by all segments of the population. Consumers at the lower end of the socioeconomic status scale may find the information too difficult to comprehend and, therefore, not use it even if they are aware of the information. Second, if the nutritional information is vague or presented in loose terms, such as high or low content, it is not likely to have a major impact on consumer liking or preferences for certain products as well as behavior changes (French and Barksdale, 1974). Also a study by Asam and Bucklin (1973) points out that when too much information is provided and product selection becomes complex, buyers tend to skim product information, and their comprehension is reduced.

As with most information programs, the issue of information complexity and subsequent comprehension is an important one. A study by Lenahan et al. (1973) provides insight into this issue. Over 35% of their sample indicated they would be willing to pay something for such information.

This can be interpreted as an awareness on the part of the consumer that personal benefits could result. Second, and most important, understanding of the information, use of information in evaluations, and knowledge of nutritional information all increased over time with the duration of the program.

Not only is there concern by consumers with information that helps them improve their purchase behavior for personal benefit, but there is also a rising interest in more socially useful information for making purchase decisions. Henion (1972) found that consumers switched detergent brands from higher to lower phosphate content when the subjects were informed about the amount of phosphate.

A dimension of current concern is energy usage. Information in this area provides the consumer with the opportunity to act not only in a socially responsible way but also for his own personal benefit. That is, saving energy by purchasing more energy efficient appliances helps in the national concern for energy saving, and it saves the consumer money by reducing fuel bills. Compared to the other areas, relatively few studies have been done in this area. Haas and Rogers (1975) report that the magnitude of noxiousness of a potential energy crisis affected attitudes, in the predicted direction, toward energy consumption. A study on the impact of energy efficiency ratings by Chestnut (1976) found that numerical rating facilitates memory during processing, but a semantic rating is required for effective storage of consumer information.

Many of the concerns with the information provisions mentioned earlier also apply to energy data. For example, research needs to be done in the area of complexity and consumer confusion with the possible rating systems. Consumer education will be a factor. It needs to be established whether the cost of providing such information will be equalled or exceeded by consumer benefits. A thorough discussion of some proposed programs and reports in the energy area will be given in a later section of this chapter.

In analyzing the consumer information provision movement in its total perspective, Walker, Sauter, and Ford (1974) provide some interesting insights. They note that while much of the consumer oriented legislation is assumed to have a beneficial impact, situations may occur where the law fails to accomplish its objectives due to a poor design, weak implementation, enforcement, or illegal business actions. Also, a law may lead to unforeseen strategy changes which may minimize or even nullify expected benefits. Walker et al. go on to break down the effects of information programs.

They note that the basic rationale for consumer protection is to improve consumer welfare by enabling the consumer to attain a higher level of utility through increased product quality, more information, and fewer risks. But, there are certain costs to the consumer involved also. Expenses to establish government enforcement mechanisms and the conducting of the enforcement efforts are factors. The firm's reaction may be to increase prices to cover costs of compliance or to take away free service facilities and possibly even to reduce the quality of his product.

However, such information programs may also provide nonuse benefits to the consumer (Lenahan et al., 1973). The new information may provide a new basis for product competition. It may increase consumer awareness of the dimension through advertising. The program could increase goodwill toward the industry. And, it may cause the industry to concern itself more with the functional aspects of their products (i.e., nutrition, energy, price, etc.).

An article by Thorelli (1971) in which he explains the Swedish experience in providing consumer information through product labeling provides some interesting facts for consideration in information provisions. The Swedish experience found that several factors affected information impact:

(1) Credible testing methods.

(2) Labels must not be too technical.

(3) Labeling and other information provision plans do not sell themselves.

(4) Large investments have to be made in the promotion of the programs.

(5) Brochures should always be available.

The results of these studies and the questions and concerns raised by the authors show that provision of consumer information is not a simple task. Its effectiveness is dependent on multiple factors and even how one chooses to define "effective." In summary, Day (1967) notes that the pressure for additional information should continue to increase, and that the future will see greater attention paid to disclosures of efficiency and comparative information. Reflecting this premise, much of the recent movement toward providing consumers with more objective information has been directed at durable goods.

Durable Goods

Granbois (1961) notes that the value of information relating to products is determined mainly by three factors. The first is perceived risk, which may take various forms. The amount of monetary outlay is a common factor. Risk will also tend to be higher for products with a long life span thereby providing a long-term commitment for the consumer. Products with social consequences attached to the purchase may also be in the high risk category. The second factor is the consumer's stored information and past experience. In this case the value of the information should vary inversely with the amount of information and experience the consumer has accumulated. The third factor involves the number and character of available alternatives. The relationship between these factors and the characteristics and information availability of durables provide strong support for the current emphasis on objective information provision for durables.

Background on Durables

Durables are defined as tangible goods which normally survive many uses (Kotler, 1972). Important characteristics include high initial purchase price, product complexity, energy use, and infrequency of purchase. The importance of these characteristics are reflected in most durable goods manufacturers' marketing mixes. In addition, these characteristics are present for durable goods:

(1) Risk. Most consumers would agree that purchasing a durable good involves considerable risk. Purchase price is usually in the hundreds of dollars. Units are becoming increasingly complex with the rapid advancement of product technology, and the product is usually considered an investment which should last a decade or more. In addition, some durables, such as refrigerator-freezers are viewed as more than just a piece of equipment. Rather they are an integrated component of the house--a piece of furniture which carries certain social significance.

(2) Stored Information and Past Experience. The long interpurchase intervals for durables tend to reduce feedback effects from former buying experiences. Also, personal experience with products may be a significant contributing factor in evaluating products. However, in the case of durables, this is sometimes not so easy. Many things can happen to a company and its product in the say 14 year span since you purchased your last refrigerator-freezer from them. In fact, the rapid technological advances in many product areas have succeeded in producing what some would regard as a completely different product with a new and expanded role to play for the consumer (witness the emergence of the refrigerator-freezer with automatic ice and water dispenser and radio and tape deck). Past information and experience may be of little help in dealing with and evaluating such products.

(3) Number and Character of Available Alternatives. Not only have the number of brands increased significantly over the years, but with the addition of a multitude of available features, the number of models per brand has also increased substantially. The end result is a more complex product environment for consumer product comparisons.

Much of the concern with information regarding durable goods revolves around the substantial financial investment of the American people in this product class. Dimensions of concern include purchase price, repair cost, and energy use. Using 1972 data, the M.I.T. Report on consumer appliances quotes the following yearly figures:[1]

---

[1] These figures represent early 1970 costs. A study currently under way under the direction of Professor R. T. Lund of M.I.T. through N.S.F. will be released in early 1977. The study on warranties, service contracts and alternatives will provide additional data in these areas.

A.	Cost	
	1. Home electronic products	$5.4 billion
	2. Other major appliances	$7.5 billion
B.	Repair	
	1. Radio and T.V.	$1.5-3.2 billion
	2. Other major appliances	$900 million
C.	Electrical Energy	
	1. Current	$5 billion
	2. Future (1980)	$8.75 billion

In addition, the M.I.T. Report points out that possibly the greatest area of consumer concern is with the cost and quality of products and service. Manufacturers are being blamed for poor product design, faulty manufacturing, and deceptive warranty and advertising practices. Repair service is seen as inconsistent and too expensive. The conclusion is that the American consumer is not only becoming increasingly concerned with the price/quality relationship for durable products, but also with why he pays what he does. A number of studies discuss these problems directly and will be summarized below.

In an excellent article drawing from much of the literature on durable goods, Granbois (1961) presents a total process model including problem recognition, search and deliberation, selection and outcome, and post-purchase behavior stages as a framework for organizing the theoretical propositions surrounding the durable goods area. Many of the empirical articles relevant to durables fit nicely into this schemata.

Problem recognition is characterized as a disequilibrium between a family's present assortment and its desired one. This may be due to a number of reasons, but the two most probable are the decline in the serviceability of the product and/or a change in the size or quality level of the desired assortment. The basic elements of the problem recognition model are:

(1) Determinants of decreased satisfaction with present assortments;

(2) Determinants of increased attraction to alternative products and mixes;

(3) Enabling conditions and attitudes consistent with a change.

Decreased satisfaction with present models may be the result of breakdown, style changes, a changing conceptual view of the product's function and determinant attributes, or family considerations. The attractiveness of alternatives will be a function of their ability to meet the new criteria the consumer has set up for the product. Dimensions such as size, number, features, price, efficiency, and style are possible factors by which alternatives can be judged. The enabling conditions involve factors such as current and future income, credit, assets, etc.

Granbois (1961) notes that one of the most consistent empirical findings to emerge from the study of decision processes for durable goods is the variance among households in the degree of search and deliberation. For example a survey by Katona (1966) found that (1) deliberation was sometimes very short with one or two features being the major focus, (2) deliberation differed by income, education, and time pressure, and (3) the process was different for different products.

The degree of search and deliberation appears to be a function of the value of the information and the cost of acquisition. The former, as discussed earlier, is determined primarily by the degree of risk associated with the product, stored information and past experience, and the number and characteristics of available alternatives. The cost of acquisition refers to the amount of time and effort spent in search, the decision making process, and completing the transaction. The consumer engages in a tradeoff between time spent, his budget, and factors such as risk.

The type of information used in the decision process is somewhat determined by the product class. Brandt and Day (1971) note that long interpurchase intervals for durables reduce the feedback effects from former buying experiences. The logical implication would be that a great deal of outside information search would occur given the nature of the product and the lack of reliable experience.

However, the results of Day and Brandt's study do not back this up. They found that nearly one-half of all their subjects shopped at only one store. In support of this finding, Dommermuth (1965) found that 59% of his subjects examined only one brand of refrigerator. Also Nourse and Anderson (1973) report that consumers have a low threshold for the quantity of data (i.e., label information) they use in a purchase decision, and if there is too much information, at least some subjects will ignore all of it.

The amount of search apparently varies by consumer and product. Most research in this area has utilized bivariate analyses of demographic data leading to the conclusion that such variables are important in determining the amount of search activity (Brandt and Day, 1971). However, the results of Brandt and Day's study show that these variables are not important when variables such as duration of shopping time, price, and prior experience are also considered. This finding led to the possibility that there may be two or three classes of buyers for major durables. Smith (1970) delineates four possible classes:

(1) presold consumer. These are consumers who have already decided on specific brands prior to entering the retail outlet.

(2) pliable customer. Brand choice is a function of in-store factors, particularly salesmen.

(3) store loyalist. Store loyalty determines brand choice.

(4) rational shopper. Consumer decisions are based on a careful study of product qualities using objective comparisons such as price, physical characteristics, etc.

The stage following information search involves _selection and outcome_. The selection of a particular brand or product is a function of the evaluation of possible alternatives (including a no purchase option) and external factors. That is, purchase plans are not always carried through for various reasons not involving the actual product. The likelihood of purchasing a particular brand of durable goods is determined by three main factors according to Ferber (1955):

> (1) The consumer's ability to make the physical purchase. This is partially determined by factors such as family income, credit availability, etc.
>
> (2) The product's utility for the family. This may be measured by quality of service provided, age and deterioration of present model, and the priority of purchase for this product over other possibilities.
>
> (3) The utility of the brand. This is reflected in current brand ownership, satisfaction with that brand, awareness of other brands, relative prices, quality perceptions, etc.

Once the product has been purchased, the concern shifts to _post-purchase behavior_. Much of this behavior involves the interaction of consumer and product. And, a significant proportion of this behavior involves the servicing of the product.

Mason and Himes (1973) conducted a survey of consumers to record their experiences in trying to seek relief for problems involving product malfunctions. They found that 30% of those consumers that registered a complaint on one

12-month period had to make at least three complaints before satisfaction was received. Over 18% did not receive any satisfaction. Others had been seeking relief over an extended period of time.

Backing up these findings, Adler and Hlavacek (1976) found that consumer distress with repair service is growing. They go on to note that this is not surprising when viewing the role of service costs in light of the total product cost. However, respondents were willing to pay disproportionately higher amounts to have lower cost products repaired. Also, as the average purchase cost went up, consumers were more willing to pay higher repair costs.

Life Cycle Cost (LCC) and Durables

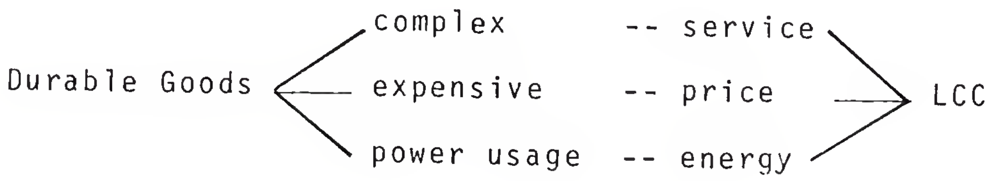
Durable goods were chosen as the product class to be considered in this dissertation due to current and future emphasis on the availability, and utilization by consumers, of "objective information" in product knowledge and evaluation. Because of the increasing concern with objective information provision, especially as it relates to durable goods as emphasized in the last section, and the lack of available research dealing with such dimensions in a marketing context, I have chosen to use the construct LCC as the focus of my dissertation. A more detailed explanation of LCC, its components, and how their integration should benefit consumers will be given in Chapter 3--Life Cycle Cost. The purpose of this section is to tie together the general problem area of objective information provision, durable goods, and the LCC construct so that the relevance and the relationships between the three can be put into sharper focus.

The 1974 M.I.T. Report defines life cycle cost (LCC) as the sum of all dollars paid for an "average" product during its useful life. Discounting of future expenditures was used in making present value calculations since power and service costs are necessarily spread over the life of the product. The components of LCC include:

1. Purchase price
2. Operating costs
    a. Energy
    b. Maintenance
    c. Service
3. Disposal costs

However, for the purposes of this dissertation, the components will be collapsed to price, energy, and service. Maintenance and service costs have been combined into one component, service, and disposal costs were "disposed" of since they typically account for one percent or less of total LCC.

The advantages of studying objective information provision for durables are numerous. First, the components of LCC can all be presented in common units of measurement--dollars--which provides the consumer with the opportunity for easy comparisons between components. Second, cost figures are presented in a common time frame--average product life--which also allows the consumer to evaluate the characteristics in a more consistent manner. That is, the energy dimension is weighted in a more realistic manner. Rather than comparing total price to some energy per month or year figure or by kilowatt hour, the consumer will be able to compare total price to total energy cost. Also, product cost is presented in a more inclusive fashion. Cost will no longer be equated almost solely with price but with price plus energy plus service costs. Third, there is a direct relationship between the characteristics of durables and the components of LCC:



Fourth, the infrequency of purchase associated with durables puts a premium on the availability of information and its presentation in such a way that the consumer can readily use it. LCC appears to represent such a conceptual framework by providing a construct whose composition encourages the consumer to shift his perception of cost from a singular reliance on purchase price to the broader and more complete concept of long run total life cycle cost.

Refrigerator-Freezers and the Durables Construct

Refrigerator-freezers were a major focus of the voluntary labeling program and the 1974 M.I.T. Report and is currently the subject of an information provision on the part of the Energy Policy and Conservation Act to be implemented in early 1977. An examination of the dimensions of this product reveal that such an interest is justified, and provides the rationale for this product to be used as the durable good to be considered by the subjects in this dissertation.

The refrigerator-freezer is perhaps the most necessary product in the home today. This is evidenced in the fact that it is in almost every home in the United States. The function(s) it provides the consumer are many. They may range from the basic food storage function to a convenience feature for parties to a strategic place to locate a tape deck and radio.

Whatever the function may be for the consumer, the product has high economic importance in both a national and individual sense relative to most other products. It is one of the few products in the home that is plugged in and runs continually. That is, the consumer does not have the option of turning it on and off as he pleases. It was estimated in the M.I.T. Report (1974) that a 50% reduction in the energy consumption of the refrigerator-freezer would save 3%

to 4% in the total electrical consumption in the United States. The pie diagram from the M.I.T. Report in Figure 1 shows the breakdown of electrical energy use by the residential sector for 1967.

Power costs for the refrigerator-freezer are not expected to decrease in the next few years either. This is mainly due to the addition of new features like frost free, automatic ice and water dispensers, increased size, etc. which add to the load. In fact, power costs have been rising until they now account for 58% of the total cost of refrigerators (Figure 2).

As can be seen from Figure 2, service costs do not have the magnitude of power costs, but 6% still remains a significant figure. Service costs are projected to drop by as much as 11%, from 18 to 16 million calls between 1973-1980. However, the drop is not expected to be as fast over the last seven years.

In summary, the concern with refrigerators is justified at both the national and individual level. It is the combination of wide public use and expense that prompted the author to use refrigerator-freezers in this dissertation.

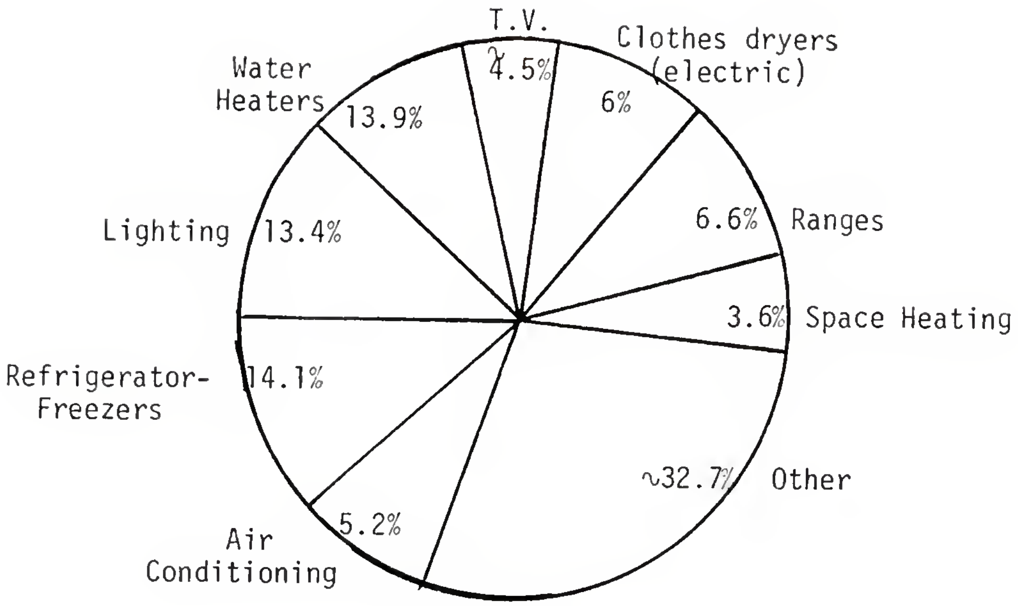


FIGURE 1

Estimated Breakdown of Electrical Energy Use by The Residential Sector for 1967 (M.I.T. Report, 1974)

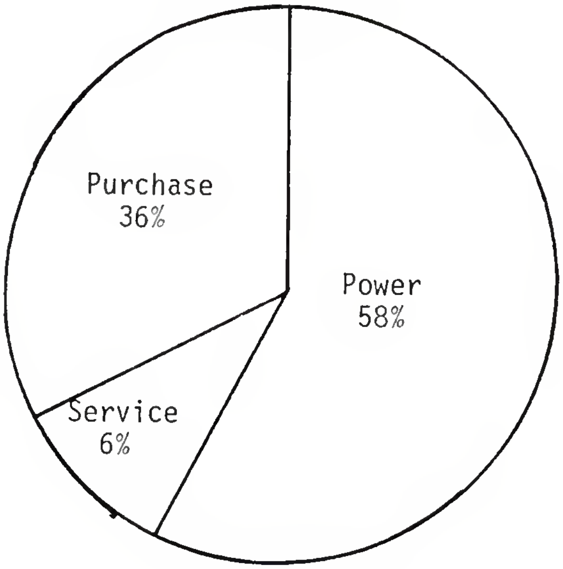


FIGURE 2

Components of 1972 Discounted Life Cycle Costs for Refrigerator-Freezers (M.I.T. Report, 1974)

Programs and Reports Applied to Objective Information Provision

A number of programs and related reports have focused on one or more of the components of LCC. Among them are the Voluntary Labeling Program for Household Appliances and Equipment to Effect Energy Conservation, The Energy Policy and Conservation Act, and the M.I.T. Report. Because of the importance and direct implications of these documents, they will each be summarized below.

Voluntary Labeling Program

On April 18, 1973, in a message concerning energy resources, the President directed the Department of Commerce, in cooperation with the Council on Environmental Quality and the Environmental Protection Agency, to develop a voluntary program for the energy efficiency labeling of household appliances. The Voluntary Labeling Program for Household Appliances and Equipment to Effect Energy Conservation was established to deal exclusively with major energy consuming household appliances. Among the appliances covered were room air conditioners, refrigerators, refrigerator-freezers, freezers, water heaters, clothes washers and dryers, dish washers, ranges and ovens, and central heating and air conditioning equipment. Energy information would be displayed on labels attached to the appliance. The general purposes of the program were defined as

(1) Encourage manufacturers (including private brand labelers) to voluntarily provide consumers with information concerning the energy efficiency or energy consumption of major durables.

(2) Encourage consumers to utilize the information when evaluating products by providing, at the point of sale, energy information presented in a uniform manner and readily understandable in order to facilitate product comparisons.

Under this program, a labeling specification was to be developed for each type of appliance. The specification set out test methods, label design, label requirements, and requirements for manufacture participation. Specifications were developed with the assistance of consumers, retailers, manufacturers, and interested Federal agencies. A particularly notable feature resulting from this interaction is that each label contained not only an energy rating but also a range of energy consumption for all products of a similar size.

Early accomplishments of the program included final specifications for labeling room air conditioners and proposed specifications for labeling refrigerators, refrigerator-freezers, and freezers. Examples of these labels can be seen in Appendix II. Consumer information pamphlets were published and consumer education and information activities were undertaken. Press releases accompanied the publication of each proposed and final procedure and specification. Photographs of the final room air conditioner label appeared in many newspapers. In addition, a general program brochure and a room air conditioner brochure were published and more than 100,000 copies were distributed. Also, a slide tape program describing room air conditioner labeling was prepared and set to be distributed to consumer groups. Also, radio and television spot announcements were to be broadcast on a public service basis.

Results of the program include the fact that 24 manufacturers representing an estimated 95% of room air conditioner sales in the United States were participating in the Energy Conservation Labeling Program as of 1975. Results of consumer surveys indicated that the manufacturers' use of the labels would benefit consumers, and consumer response to the program indicated by marks of consumer representatives and requests for brochures were clearly encouraging. Also, a survey of energy efficiency ratios for room air conditioners showed an improvement of 6.5% in energy efficiency between January 1974 and January 1975. This indicated a strong response by manufacturers to enter into the energy conservation effort. However, in 1976 this voluntary program was abolished coinciding with the passage of the Energy Policy and Conservation Act, which required a mandatory labeling program. The FEA and FTC now carry the primary responsibility in the labeling area under this act.

It would seem that the LCC construct could help facilitate realization of program objectives of this type even further. First, it encompasses total operating costs, not just price. Second, it can help in consumer understanding of the objective information by providing a consistent representation of the components and a familiar unit of measurement, dollars. Finally, it encourages consumer awareness of product cost by using a high level of aggregation in its composition.

Energy Policy and Conservation Act

Congress passed the Energy Policy and Conservation Act December 22, 1975. This act has a broad range of purposes, but the most immediately relevant one is to "conserve energy supplies through energy conservation programs and, where necessary, the regulation of certain energy uses." Products covered in this act are the same ones covered in the Voluntary Labeling Program plus home heating equipment, furnaces, television sets, and humidifiers and dehumidifiers. Among the important priorities dealing with these products include testing procedures, labeling, energy standards, and consumer education.

Test procedures will be prescribed in order to determine (1) estimated annual operating costs of covered products and (2) at least one other measure of energy consumption which will most likely assist consumers in making purchase decisions. Among alternatives availble are "energy use" (i.e., quantity of energy directly consumed such as kilowatt hours) and "energy efficiency" (ratio of the useful output of services from a consumer product to the energy use of that product).

The Federal Trade Commission will also prescribe labeling rules for the covered products. Each label must disclose:

(1) the estimated annual operating cost of such products covered and

(2) information regarding the range of estimated annual operating costs for covered products.

The labels would be required to be displayed in such a way so as to provide the most assistance to consumers in making purchase decisions. The information may be presented on a tag at the point of sale.

Also, the Federal Energy Administration, as administrator of the Act, may in the interest of improving energy efficiency, prescribe an energy efficiency standard to any type or class of covered products. It is further stipulated that the energy savings resulting will have to outweigh any increase in price or maintenance expense, lessening of product performance, or negative effects on competition in order to be implemented.

In addition to testing procedures, labeling, and standards, the Federal Energy Administration shall carry out a program to educate consumers in areas of

(1) the significance of estimated operating costs,

(2) ways in which comparative shopping can save energy for the nation and money for consumers, and

(3) other matters which may encourage conservation of energy.

Again, the applicability of a construct such as LCC in helping to realize program objectives is clear. While the act is specifically concerned with annual costs, LCC is particularly suited to presenting energy information reflecting savings or costs over "the estimated average life of the product." In addition, the significance of the operating costs are magnified by the level of aggregation used, and comparative shopping is made easier with the standard and recognizable presentation of the cost data.

The M.I.T. Report

This report provides the strongest case for the use of a construct such as LCC in the area of information provision for durable goods. The M.I.T. Report was conducted by the Center for Policy Alternatives at M.I.T. with the Charles Stark Draper Laboratory, Inc. (1974). Funding was supplied by the National Science Foundation (NSF) under the RANN Program. Various advisory groups from industry, academia, and consumer organizations also participated. The research and study from which the M.I.T. Report was taken was entitled "The Productivity of Servicing Consumer Durables."

The scope of the study included durable goods within product categories of general household appliances, air and water processing appliances, yard and garden equipment, and entertainment and communication appliances. The report itself concentrated on color televisions and refrigerator-freezers. The main task of the project was to explore the productivity of the delivery of service to the American public as it related to major durables. Because of the dependence of service factors on other operational and acquisition characteristics, a systems approach was utilized in research. Consequently the major concern of the study became the optimization of LCC, and the major objective to ". . . evaluate alternatives for increasing productivity of servicing consumer durable products and/or reducing the need for service, in the context of total cost." A comprehensive discussion of the LCC construct and its implications for consumer information as a result of the M.I.T. Report's findings will be the focus of Chapter 3--Life Cycle Cost.

The M.I.T. Report rightfully acknowledges that there is a general concern with energy across the nation. Also, there is increasing concern and discontent with service related matters, and that price is still an important consideration in purchase decisions. However, they go on to state that consumers have somehow failed to recognize (or have chosen to ignore) the relationship between energy costs and appliances and/or the importance of the relationship. Further, consumers have not sought out energy and service related information during product evaluation. This is advanced as one reason why manufacturers have not been encouraged to develop energy efficient products. Also, it appears that consumers have opted for increasing convenience associated with product use at the expense of increasing energy consumption by such products.

The major conclusions of the M.I.T. study are that the consuming public is generally not aware of the total cost of appliances (i.e., LCC which includes purchase price, energy cost, maintenance and repair costs, and disposal costs). On the manufacturers' side, the introduction of energy conserving design changes will probably have to come at the expense of higher prices. Realistically, this type of action on the part of manufacturers will occur only if consumers will respond to them in a positive manner. And, this will necessitate a shift in consumers' perception of cost from sole reliance on initial purchase price to the concept of long run total life cycle cost. Consequently, there is a need for consumer research in this area which reflects the changed environment, pays particular attention to consumer response measures, and measures the impact of the LCC construct.

In summary, the main purpose of the M.I.T. study was to increase understanding of the system for maintaining and servicing major home appliances. A systems approach was used, and the concept of total costs paid by consumers over a product's useful life was emphasized.

Various problems were brought to attention, especially in the area of service billing practices and warranty claims (The M.I.T. Report, 1974). Overall, however, it appears that industry has given consumers more reliable and efficient products. Even so, the consumer who depends on price as his main evaluative criteria is not aware of the significant energy and service costs. In the conclusion of the M.I.T. Report a number of steps, at the consumer, manufacturer, and government levels, are delineated for improvement of problem areas. These are summarized below.

A. Consumer level

1. Use the concept LCC and actively seek out information on energy and service costs as well as price.
2. Reduce service costs by making sure the product is really malfunctioning before placing a service call.
3. Use official channels of complaint in order to reduce abuses.
4. Carefully evaluate added features and conveniences of products in light of their energy costs.

B. Manufacturers

1. Develop better ways to alleviate warranty abuses which increase cost and inflate performance information.
2. Improve the warranty system by making it longer and developing accurate feedback channels to determine appliance performance during the warranty period.

3. Respond to the LCC concept by designing and manufacturing products that represent an optimal balance between the components.
4. Provide consumers with LCC data at the point of purchase.

C. Government

1. Provide incentives that would reduce life-cycle costs.
2. Monitor service technician needs and aid in development of training and education functions.
3. Study in more detail how warranties and service contracts affect the marketing channel, and develop less costly means of dealing with appliance failure.

The conclusions and recommendations of the M.I.T. Report provide the impetus for the focus of this dissertation. Their conclusions regarding the usefulness of the LCC construct and its impact on consumer response can be explored within the context of a consumer research study. Consequently, the focus of this dissertation will be LCC studied within the problem setting of a potential durable goods information provision. Particular attention will be paid to the application of LCC information to product features.

CHAPTER 3

LIFE CYCLE COST

The construct LCC was briefly discussed in Chapter 2, General Problem Framework, and its importance to the potential success of an objective information provision has been brought up in various examples. The purpose of this section is to look at LCC in detail, both as a conceptual construct and as a tool for projecting objective information to a consuming public. The three dimensions of LCC relevant to information provision are

A. What Is The LCC Construct?

B. What Impacts Might It Have For Consumers?

C. Can It Be Effectively Communicated to Consumers?

While all three are equally important, the focus of this dissertation, and subsequent discussion, will be on the first two--conceptualizing this new form of product cost information and projecting its potential impact. The issue of communication effectiveness basically involves reception of the message by consumers. Levels of concern in this area include whether or not (and how) LCC can best be communicated at (1) a conceptual level, (2) product class level, and (3) brand level. These are essentially questions of format which logically follow answers to the first two questions, and which can be overcome by policy and marketing strategists. Consequently, concern here will focus on issues one and two. The first involves dealing with the construct at an aggregate level. The purpose here is to characterize the consumer environment, not the individual consumer, and provide an overview of the questions and issues in a policy sense. The second stage will then be concerned with impact questions at the consumer level.

What Is The LCC Construct?

The basic components of LCC include (1) product *life* and (2) product *cost.* The product's life cycle is its useful life expectancy as determined by consultation and testing with various agencies and manufacturers. Cost may be divided into initial costs and operating expenses. Initial costs refer both to manufacturers' cost of production and the price consumers pay for the product. Operating expenses include both various service outlays and energy use. The definition of LCC as supplied by the M.I.T. Report is "the total dollars that will be expended over the product's useful life." Dollar expense may be broken down by

1. Purchase Price
2. Operating Costs
    a. Energy
    b. Maintenance
    c. Service
3. Disposal Costs

However, for the purposes of the report's calculations and this dissertation, the components were collapsed to three--purchase price + energy cost + service cost. Disposal costs were not included since they typically account for less than one percent of the total.

The LCC for various products in the M.I.T. Report were calculated on an average basis by year of manufacturer and year of use. In addition, calculations for power and service costs involved the technique of discounting future expenses in making present value (PV) calculations. This was done to account for the fact that these costs are necessarily spread over the life of the product. In addition, constant dollars were obtained by deflating life cycle costs using the Consumer Price Index (CPI). This provided units of cost not affected by inflation.

The M.I.T. Report's major concern was with the ultimate optimization of LCC, not with providing the research and formats necessary for the implementation of a consumer information program concerning the LCC construct. Consequently, research and analysis was done at an aggregate level. That is, the concern was with industries and product classes as the entity, and findings are reported as averages for the industry rather than by individual model or brand. For example, Figure 2 showed the average component costs for refrigerator-freezers. In the advent that an information program using LCC is implemented, it remains a policy question as to the best way to calculate and present the data. However, to gain a better understanding of how the M.I.T. figures were arrived at, the following is a summary of how the component costs were calculated. Notice especially that in case of an information provision in the area, price, as calculated here, would not be serviceable for brand or model evaluation. But, the figure could serve as a baseline reference by which the consumer could compare the stated price for the unit in case it was decided that such information would be of benefit to the consumer.

(1) Price. Product price represents an aggregate measure of initial cost. That is, the price figure is arrived at by taking the average sales value to final customers as reported in Merchandising Week. This gives a representative unit price for the industry. An additional feature is that purchase price also reflects the cost of product warranty to the consumer.

(2) Service. Product service costs are defined as all money paid by the appliance owner to the serviceman. Basically, these costs are a function of the service incidence rate (SIR) and the cost of providing the service. Calculations are based on a linear projection of average service cost per repair. The annual SIR for each year is then multiplied by the average repair cost for that year. This gives an annual service cost figure which is then summed over the life of the product.

(3) Power. Energy use is defined as the cost of electricity to operate the appliance. Power costs are particularly hard to project because of the uncertain future of the nation's energy supplies and the recent "energy crisis." Consequently linear extrapolations from historical data were used. For refrigerator-freezers, power costs were calculated by taking daily power use * 365 * cost of power for that year. This provided an annual cost which was then summed over the product's average life.

Because of the increasing concern with objective information provision which was established in Chapter 2 and the lack of available research dealing with such dimensions in a marketing context, especially with regard to durables, the concept of life cycle cost is a particularly appropriate vehicle for dealing with both dimensions. It provides a new and unique way of conceptualizing product cost. Its potential advantages are discussed below.

First, it can be used as an organizing principle for the objective information. It provides a common time frame for comparing product costs (i.e., the product's useful life). This is an especially important point when consumers begin comparing price to energy costs. It allows the consumer to evaluate the components from a more accurate perspective. That is, the comparison will now be between total price and total energy costs rather than between total price and some fraction of energy cost. In addition, it also incorporates a consistent and familiar unit of measurement--dollars. While other methods of presenting cost data use the dollar format (e.g., dollars/month, dollars/year), the combination of these factors should prove to be somewhat more advantageous for the consumer.

Second, the dependence and interactions among the components are more clearly defined making trade-offs between components such as energy v price easier to recognize and more likely to occur. One of the findings of the M.I.T. Report is that products do have considerable room for improvement of both energy and service costs. However, an interaction effect must occur. That is, energy and service savings resulting from new technology and improved products will result in an increase in price. The trade-off then becomes one of deciding whether energy savings are worth the extra price.

For example, it is known that better insulation will result in reduced energy consumption. The M.I.T. Report gives an example of how this trade-off may occur. If the value of energy is \$.03 per kilowatt hour, the cost of insulation is \$7, and there is a 2 to 1 markup to the point of sale, the increased insulation will cause a \$14 increase in price.[1] However, the reduction in heat leakage will reduce kilowatt hours from 1840 to 1402. Savings in electricity will be $13.14 a year based on $.03/kilowatt hour. If the savings are discounted at 6% for 10 years, there will be $99.10 energy savings. The net gain is $85.10; and, therefore, the extra insulation material is economically justified. These costs will already be provided to the consumer by the LCC construct, so that the trade-offs can easily be made. Of course, whatever decision is made will depend on individual and certain situation specific factors also.

---

[1] The cost per kilowatt hour will vary by area and year. The \$.03 figure is based on 1974 data. As of 1976, the figure is closer to \$.035 or \$.04, which reflects the increase in energy costs over the two-year period.

One such situation specific factor is whether the consumer feels the savings are great enough to warrant the immediate out-of-pocket expense. This brings up the third factor. It makes it easier for the consumer to recognize the importance of individual cost components. This may be a function of making the association between energy and cost for the consumer and/or presenting the information at a level of aggregation which is more likely to be perceived as significant.

Fourth, the amount of information being given to the consumer has increased. In the objective information category, the consumer will now have the opportunity to base his evaluation on three dimensions (i.e., price, energy, service) or even four if the aggregate LCC is considered as opposed to the more traditional presentation of only price. This is not saying the consumer will use the information, only that it is available. Also, the question that remains to be answered empirically is how the consumer will use the information and with what results.

Fifth, it is a construct which may facilitate consumers in shifting their perceptions of cost from sole reliance on price to a more inclusive long run total cost conceptualization. The result of positive consumer response to other cost factors (i.e., willingness to pay somewhat higher initial prices for reduced energy and service costs) may encourage manufacturers to engage in product design with the purpose of increasing energy and service efficiencies.

In the case of most new concepts, especially those dealing with consumer information, a number of questions should be advanced which will need answering in the event LCC does become a part of an information provision. First, there is the legitimate question of whether the complexity of this procedure can be accurately understood by consumers. It is possible that consumers do not think in this fashion when evaluating product cost, and it will, therefore, be either confusing to them and/or cause wrong deductions. This is an area of impact which needs to be researched, especially over time and with multiple exposures. Also, in the event LCC does become a part of the consumer environment, the question of objectives arises. The M.I.T. Report defined its purpose as the optimization of LCC. Another policy question needing an answer would be the objective of a provision using LCC. For example, is the interest in promoting the lowest total cost or lowest energy cost? While there is probably a positive correlation here, there will be cases where the consumer is put in an either/or situation. The program structure may be different depending on the answers to such questions. Other factors which will also need to be taken into consideration at the policy level include variance in the conditions of product use, variance in life spans, seasonal dependence on energy, and variance in cost by the stage of the life cycle.

The preceding discussion was mainly concerned with the concept of life cycle cost as a total entity. The M.I.T. Report also discusses each component separately. A review of this discussion by LCC dimension will help to bring the importance of the costs into focus.

Price

Of the three components in LCC, price is by far the most familiar to consumers, policymakers, and market researchers. Marketing research has dealt with "price" extensively in studies concerned with competition, optimal strategies, brand choice, and the correlation between price and other factors such as perception of product quality.

The emphasis placed on initial purchase price by many consumers is one of the concerns in the area of information provision for durables. Although, the payments may be spread over various time periods, it is essentially a short run consideration when compared to the costs associated with service and energy. While price will continue to be, and should be, a major concern of many consumers, the purpose of the M.I.T. Report, and a possible objective of an information provision in this area, was to put purchase price into a longer run perspective so that the importance of energy and service costs would not be diminished when compared to the high initial outlay. Within this particular framework, it is hoped that the consumer's conceptualization of product cost will broaden from a rather singular concern with price to include costs associated with energy and service also.

Energy

Questions concerning energy have taken on an increasing prominence in the media and an awareness by consumers with the advent of the "energy crisis." Its emergence as a national topic reflects a changed environment for the consumer. This, coupled with the fact that an increase in the cost of energy is a certainty, provides potentials reasons for consumer concern with this dimension in product comparisons.

Breaking down the energy issue from a consumer standpoint and with regards to durable goods, energy becomes important for two reasons: (1) it is an important component of the operating cost of many appliances and (2) the total energy consumed by these products is a significant portion of the total electricity consumption of the United States. For example, a 50% reduction in energy consumption by refrigerators would represent a savings of 3%-4% in total electrical use in the United States.

The individual consumer is likely to be aware of the more serious energy questions that confront our nation. What he should be doing at the individual level to help alleviate the situation is probably less clear. The concept of LCC provides a means for the consumer to see the importance of energy as a significant operating cost of his appliances.

The overall conclusion reached by the M.I.T. Report after reviewing the growing use of electricity in the home and the role that durable goods play in this growth are

(1) The growth rate of residential use of electricity is comparable to the growth rate of the total national load, approximately 8% per annum.

(2) These high growth rates cannot be sustained in the long run for a number of reasons, including the limited resources and heat balance of the earth.

(3) The consumer has been purchasing increased convenience at the expense of increased energy consumption.

(4) There are certain appliances where redesign could achieve reduced energy consumption, without sacrifice of product efficiency, and without a decrease in overall cost.

(5) Because the purchase of more energy efficient appliances generally will cost the consumer more than present ones, careful labeling and education of the consumer will be necessary to ensure voluntary adoption of such appliances.

(6) The public interest will be served if the consumer will install in his home appliances that are more energy efficient.

(7) If industry is unable to encourage the adoption of energy conserving products, it is probable that government at the federal and state levels will attempt to achieve this end through regulation.

Service

The life cycle service cost for products is equal to all the money that is paid by the owner to the serviceman. This figure does not include warranty service which is covered by the purchase price. The measurable event for calculations of service cost is the service call occasioned by the customer request. These, of course, may occur for any number of reasons. The product may be in actual need of repair. It may be in good working order, but the customer requires instruction of some manner in order for the product to operate efficiently (i.e., education call). There may be some external factor causing a malfunction. Other service calls are a function of the customer not being home. These are called service incidents, and their summation is the service incidence rate (SIR). SIR is usually calculated from industry data, consumer polls, or captive populations.

In terms of the life of the product, service costs are a substantial portion of the LCC of many durables. While the general trend is toward a slight reduction in the service incidence rate for products, the cost per service incidence rate has been rising rapidly. It is clear from a LCC frame of reference that service costs can be a significant portion of the total cost of a product. However, when looked at in the short run, if at all, it is easy for consumers to be misled. For example, the first year service incidence for T.V.'s is one and for refrigerators .3; and these, as small as they are, are even covered by the warranty. The facts seem to indicate that the rate increases over the life of the product. Considering this and adjusting for increases in inflation, the costs have the ability to become a significant contribution to the total cost of the product.

What Impacts Might LCC Have For Consumers?

The primary objective of this research is to conceptualize the nature of presumed LCC effects and explore the likelihood and ramifications of their occurrence. There appear to be at least seven presumed consumer impacts that would prove crucial to an information provision involving LCC. They are

I. Increased Information in the Marketplace, Leading to More Informed Consumers:

Apart from any impact on consumer attitudes and purchase decisions, the provision of LCC data should provide more information to the consumer in terms of both absolute amount and type. The type of information, being objective in nature, involves primarily the dimensions of energy and service, and reflects an altered and more accurate representation of "price" of alternatives.

II. Improved Conceptualization of Product "Cost":

Product cost encompasses both acquisition and operating costs so that the actual cost of owning a product occurs over its operating life and therefore involves monetary outlays for dimensions such as energy and service as well as those associated with price. The provision of LCC data will provide the consumer with the information to establish a more analytical, and accurate framework as to what constitute product "cost" by encompassing the dimensions in a common time frame and consistent units of measurement.

III. Increased Salience of Energy and Service as Cost Dimensions of a Product:

Issues surrounding energy and service are factors of concern at both national and industry levels. Consumer awareness of these concepts arises mainly from the recent "energy crisis" and a growing general dissatisfaction that products are not being made well. By accenting the magnitude of energy and service dollar costs and associating them with price in the same conceptual framework, LCC provides the consumer with the opportunity to make the transition from a broad and rather vague concern with the dimensions to a more refined and definitive association of these dimensions as integral parts of total product cost.

IV. Improved Bases for Consumer Evaluation of Alternatives:

LCC provides the consumer with a consistent basis, in both time and units of measurement, for evaluating product alternatives. The representation of LCC components allows the consumer to incorporate a finer and more accurate comparison process without difficulties of translation of disparate elements to a common factor.

V. Sharpened Cost/Benefit Judgments on Product Features:

> The increasing and rapid technological innovations inherent in many product industries have provided, and made an integral part of, many products with increasing numbers of features supplementary to the primary function of the product. The availability of LCC gives consumers the opportunity to recognize the dollar costs over time of such features above their contribution to initial price. That is, those features which are energy users (savers) and service users (savers) can be more easily recognized so that the opportunity for judgments between obvious benefits and more subtle costs become more apparent.

VI. New Trade-Offs Between Initial and Deferred Costs Reflected By Trade-Offs Among the Primary Components of LCC:

> Manufacturers indicate that the development and production of energy and service efficient products will entail greater costs and be reflected in increased prices. The present market system will support such a movement only in the advent of positive consumer reaction. LCC provides an efficient mechanism, through the same units of measurement and consistent time frame, for the consumer to trade-off the higher prices for longer run and subsequently greater energy and service efficiencies.

VII. Shifts in Products Purchased:

> The provision of more and different information through LCC provides the consumer with a changed environment by which products can be evaluated and subsequently purchased. Market shifts may result at the primary demand level, among brand preferences, and/or with regards to features and models within a brand reflecting consumer responsiveness to the new objective information provided in the LCC framework.

Within the LCC focus of this dissertation, empirical research will center on issue V, Sharpened Cost/Benefit Judgments on Product Features. This area is especially important because of the emphasis by manufacturers on, and subsequent consumer response to, product features (especially those primarily stressing consumer convenience and to a lesser extent energy savings). It appears that many of the convenience features use significant amounts of energy and, because of the general increase in numbers of features, possibly add to service costs as well. In order to better visualize the potential impact of LCC in relation to product features, Table 1 provides this author's conception of what the present environment regarding refrigerator-freezers is versus expected changes with the introduction of LCC. Both product and consumer states are projected. Major concerns in the consumer state are their purchase predispositions, perceived feature benefits, and their conceptual view of feature costs.

TABLE 1

Perceived Product Environment for Refrigerator-Freezer Features

Product	
Current Environment	Changed Environment (LCC)
A. There are greater numbers of benefits associated with features than costs: 1. Benefits a. Reduction of work time b. Social significance c. Increased efficiency in -primary functions -secondary functions d. Safety e. Dependability f. General convenience g. Energy and service savers 2. Costs a. Increased purchase price b. Increased breakdown rate due to more parts c. Energy cost increased d. Service cost increases	A. There are still a greater number of benefits associated with features than costs.
B. Trend toward increasing the number of features 1. Innovation (i.e., invention of new features) 2. Features available within a model	B. Trend continues toward increasing number of features 1. Innovativeness increases because of energy and service savings opportunities. 2. Number of features available within a model increases because of inclusion of energy and service features
C. Majority of new features are of the convenience type with a slower shift to energy and service oriented	C. Majority of new features shift to energy and service orientation

TABLE 1 (continued)

Product	
Current Environment	Changed Environment (LCC)
D. Marketplace stress is on the favorability of the features (i.e., benefits)	D. Marketplace stress is still on the favorability of the features
E. Feature information presentation 1. Convenience feature information is subjective in character (i.e., "makes clearer ice") 2. Energy and service information is subjective (i.e., "reduces energy")	E. Feature information presentation 1. Convenience information remains subjective (i.e., "makes clearer ice") 2. Energy and service information becomes more objective (i.e., dollar cost)
F. Cost data is not presented	F. Cost data is presented on the features in terms of price, energy, and service costs (strategic policy question)
G. Features which reduce energy and service secondarily are stressed	G. Features which reduce energy and service costs are stressed even more although it is their secondary function
H. Energy and service saving features are accented	H. Features dealing specifically with energy and service efficiencies are accented even more

Consumer	
Current State	Changed State
A. Willingness to pay higher prices for the product in order to obtain features	A. Continued willingness to pay higher product prices for features
B. Benefits of features 1. Consumers have more information and more exact information with regards to product benefits than costs 2. Benefits of features outweigh costs 3. There are more perceived benefits than costs	B. Benefits of features 1. Consumers have more information on feature benefits, but more exact information regarding costs 2. Benefits of features do not always outweigh the costs now 3. There are still more perceived benefits than costs

TABLE 1 (continued)

Consumer	
Current State	Changed State
C. Cost of features	C. Cost of features
1. Conceptual view of "cost" of product features	1. Conceptual view of "cost" of product features
a. Price	a. Price
(1) Association with cost	(1) Association with cost
(a) Recognized as contributing to product cost	(a) Recognized as contributing to product cost
(b) Direction of contribution is accurate	(b) Accurate direction of contribution
(c) Amount is not significant in terms of it being a factor in an accept/reject decision	(c) Amount is still not significant in terms of it being a factor in an accept/reject decision
(2) Time - Part of initial outlay	(2) Time - Part of initial outlay
(3) Measurement - dollars	(3) Measurement - dollars
(4) Level of refinement	(4) Level of refinement
(a) Extrapolation from purchase price since it is not given	(a) Price will be given
(b) Accurate recall of estimated dollar cost	(b) Less accurate recall of dollar cost due to the greater amount of objective information to deal with

TABLE 1 (continued)

Consumer

Current State	Changed State
b. Energy	b. Energy
(1) Association with cost	(1) Association with cost
(a) Not recog- as contributing to product cost or only in a very vague association	(a) Recognition as a contributing factor to product cost
(b) Direction of contribution is accurate	(b) Direction is accurate
(c) Amount is not significant	(c) Amount becomes significant
(2) Time - Monthly basis in relation to total electric bill	(2) Time - Cost over product life
(3) Measurement	(3) Measurement
(a) Possibilities- dollars/month, dollars/year, total dollars, KWH, $/cu.ft.	(a) Possibilities- dollars/month, dollars/year, total dollars, KWH, $/cu.ft.
(b) Expected - dollars/month	(b) Expected - total dollars
(4) Refinement - Perceived as being acceptable/unacceptable	(4) Perceived along a more advanced scale such as from high cost to no cost or even a ratio scale involving the actual dollar amount
c. Service	c. Service
(1) Association with cost	(1) Association with cost
(a) Not recognized as contributing to product cost or only in a very vague association	(a) Recognition as a contributing factor to product cost

TABLE 1 (continued)

Consumer	
Current State	Changed State
(b) Direction of contribution is accurate	(b) Accurate direction
(c) Amount is not significant	(c) Amount becomes significant
(2) Time - thought of in terms of the warranty period	(2) Time - thought of in terms of warranty period and product life
(3) Measurement	(3) Measurement
(a) Possibilities-cost/call, SIR, downtime, cost/year, total cost	(a) Possibilities-cost/call, SIR, downtime, cost/year, total cost
(b) Expected - downtime (refrigerator)	(b) Expected - total dollars
(4) Refinement - perceived along some ordinal scale of dependability	(4) Refinement - perceived along an ordinal scale ranging from high to very low cost or even a ratio scale
d. Summary	d. Summary
(1) Feature cost = f (dollar price + vague directional association with energy and service) · no total dollar figure is perceived	(1) Feature cost = f (price + energy cost + service cost) · a total dollar figure or at least an ordinal rating is perceived
(2) Factors	(2) Factors
(a) Level of refinement very broad except for price	(a) Level of refinement becomes more discriminatory

TABLE 1 (continued)

Consumer	
Current State	Changed State
(b) Components are not in the same units of measurement	(b) Components measured in same units (i.e., dollars)
(c) Different temporal associations	(c) Consistent temporal representation
(d) There are no significant relationships with cost in the sense of having an influence on accept/reject decisions, and their sum is also not seen as significant	(d) Although there is still not a significant relation between price and cost in terms of accept/reject decisions energy and service do become significant, and their sum also becomes a significant factor
2. Actual Costs	2. Actual Costs
a. Total cost of feature-underestimated because of failure to associate energy and service with cost	a. Total cost of feature-overestimated because of the "newness" of perceiving it in a more comprehensive framework
b. Energy and service as a percentage of total cost - underestimated because of lack of information on the subject	b. Energy and service as a percentage of total cost - overestimated because of increased visibility
c. Energy and service total absolute cost by component - underestimated because of lack of information	c. Energy and service total absolute cost by component - overestimated because of stress and visibility

TABLE 1 (continued)

Consumer	
Current State	Changed State
d. Price increment - overestimate because of technological complexity	d. Price increment - overestimate because of technological complexity
D. Judgment of Features	D. Judgment of Features
1. Attitude towards:	1. Attitude towards:
a. Convenience features-very favorable	a. Convenience features-varies by feature now but general decline
b. Energy and service features - favorable but less so (perceived as adding more to cost than they reduce)	b. Energy and service features - overall increase in evaluation
2. High certainty with regard to preferences	2. Increased uncertainty with regards to preferences for convenience features
3. There exists a positive P/Q correlation so that the addition of features will inflate the P/Q correlation	3. The P/Q correlation becomes a LCC/Q correlation and there is expected confusion as to direction
4. The perceived total cost of a feature is viewed by the consumer in relation to the total product cost (i.e., price) and ∴ is not seen as significant	4. Perceived total cost is viewed as part of LCC of the product with emphasis on energy and service and ∴ becomes significant

CHAPTER 4

DESCRIPTION OF STUDY

The purpose of this chapter is to translate the general problem framework of Chapter 2 and the LCC concept of Chapter 3 into a research format for testing the impact of new product information on consumers. Topics to be covered include

(1) The relationship between the problem framework discussed in Chapters 2 and 3 and levels of consumer response.

(2) A description of the preliminary focus group interviews and results.

(3) A formal statement of the relationships to be studied (i.e., presentation of hypotheses).

(4) A discussion of the research design, sampling, and control procedures.

(5) A description of how each hypothesis will be tested, presented within a general explanation of the conduct of the experiment.

Impact of New Product Information: Levels of Consumer Response

It is well recognized that "impact" can be measured in a variety of ways--attention, attitude change, purchase behavior, etc. One way of classifying the impact of information is by a "hierarchy of effects," which allows for study of different types of consumer response. The hierarchy of effects concept is most often related to stages of consumer decision processes (Lavidge and Steiner, 1961; Rogers, 1962). The decision process is usually described as a sequential and reiterative series of psychological and physical activities ranging from problem recognition to postpurchase evaluation. In addition, one of the common features of consumer decision-making is that separate stages of thinking are linked together over time, and the consumer passes through these stages in a loose but specified order as he moves toward final purchase. Lavidge and Steiner's cognitive-affective-conative sequence of psychological states gives a conceptual view of the pattern of responses a consumer might go through as he gets closer to actual purchase (Markin, 1974):

(1) Some consumers, of course, are completely unaware of the product or service.

(2) Next, are those who are aware but not interested.

(3) Further along are those who know what the product has to offer.

(4) Next, are consumers who like the product.

(5) Closer to final purchase, are consumers who prefer the product over others.

(6) Even closer are those who have a conviction that the purchase would be wise.

(7) Finally there is the actual commitment-purchase.

These steps can be condensed into stages for the consumer--awareness, knowledge, liking, preference, conviction, and purchase. Lavidge and Steiner (1961) present these steps in a sequential process to form a "hierarchy of effects" concept (i.e., cognitive involves knowledge and awareness, affective includes liking and preference, and conative includes conviction and purchase). However, some of these stages are hard to separate. For example, "conviction" represents conative activity in the Lavidge and Steiner sense. Presenting this concept as a behavioral tendency and separating it from the affective state is hard to do, both at the conceptual and operational levels. However, there does appear to be certain internal psychological processes a consumer usually experiences from the perception of some form of communication, and the various components are subject to a persuasive process (Markin, 1974).

The idea that a pattern of consumer responses does exist as he moves closer to purchase will be incorporated into this study because it provides a useful framework for delineating the impacts of new product information on consumers. It is especially beneficial given both the nature of the study and the information. The experiment is constrained to one sitting for the subject, so his exposure to the cost information is limited. Also, the LCC concept and accompanying cost information will be "new" to the subjects so that any results, or lack of them, do not necessarily reflect consumer response given multiple exposures and experience. Impact measures which reflect only later stages of consumer activity and response, such as purchase behavior, cannot be expected to give complete information regarding the effect of the new information on consumers after such limited exposure. The information may very well have had an impact on the consumer in the form of increased awareness, understanding, recall, and/or liking. Consequently, this dissertation will explore the impact of new product information on consumers by various methods and measures aimed at a range of consumer responses.

Focus Groups

Focus group interviews are a much used tool in consumer and market research. There are a number of reasons why such a technique may prove useful. As Dupont (1976) notes, the interviews can be done quickly and relatively inexpensively. They allow the researcher to talk face-to-face with consumers. They provide the nonresearch client with the opportunity to listen to what consumers actually say. Also, the situation in which the interviewing is done is flexible and allows for subjects to interact and stimulate one another.

However, the most important function is to guide the design and conduct of a larger study. It is within this framework that the focus group interviews for this dissertation were conducted.[1] The primary purposes were to

(1) Explore the current state of consumer knowledge and attitudes toward refrigerator-freezers and associated features, and to obtain information about possible variations among consumers regarding these dimensions.

(2) Gain a better understanding of consumer language used in thinking about refrigerator-freezers. Dupont notes that the determination of what terms consumers use and what they mean can prove beneficial. In the case of the current study involving a relatively new product environment in terms of both information and attributes it may also prove equally interesting to note what terms and dimensions they do not use. Specifically, the inclusion, or lack of, an energy dimension in the consumer evaluation or knowledge set may be helpful in the determination of program objectives and directions.

(3) Increase understanding in the area of cognitive complexity with regards to consumer views of dimensions of refrigerator-freezers. That is, what is involved in consumer knowledge and evaluation of the product? Is it a relatively simple process, thought of in terms of very few dimensions, or is it more complex involving many dimensions of varying complexity?

Because of the nature of the product, housewives were chosen for the groups. Central Florida Research, a local professional field research group, contacted a cross section of Gainesville, Florida, housewives. Subjects had varying demographic profiles (Table 2), and the groups themselves were divided on the basis of education. The high education (HEG) consisted of subjects with one year or more college education, while the low education group (LEG) was composed of housewives with a high school education or less. This was felt to be an appropriate division based on past studies which have tended to show differing responses to consumer education programs with varying levels of education (Houston, 1972: Stokes and Haddock, 1972; Day and Brandt, 1974). The number of subjects per group was eight, a number commonly cited as the maximum to use and still have an efficient interview situation (Payne, 1976). Subjects were paid ($8.00 per hour) at the site of the interview which lasted about one hour in each case.

---

[1] The sample was not expected to represent the total population, but it was felt that responses could give insight into broad issues surrounding purchases of refrigerator-freezers.

The two groups were interviewed on consecutive nights. In order to remove as many external sources of variation as possible, a standard procedure was set up for the conduct of the interviews. The first session (HEG) was monitored by a graduate student familiar with the dimensions of the present study, and the second session was conducted by the author. Subjects were placed at east with a brief, informal talk and introductions. Permission was gained for taping the session, and the interview began. The moderator explained the purpose of the interview and asked the subjects

TABLE 2

Demographic Profile of Group Interview Participants

Characteristic	Low Education Group (LEG)	High Education Group (HEG)
Age		
18-22	2	-
23-28	1	1
29-33	-	3
34-38	-	3
39-44	1	1
45 or above	4	-
Education		
11 or below	1	-
12 years	6	-
some college	1	1
college graduate	-	5
post graduate	-	2
Income		
$0-4,999	1	-
$5-9,999	3	1
10-14,999	2	2
15-19,999	2	2
20,000 or above	-	3
Marital Status		
married	6	8
divorced	2	-
Last Appliance Purchase		
1 year	4	2
1-3 years	1	5
4-6 years	2	1
7-9 years	-	-
10 or more	1	-

to place themselves in the "role of a consumer" who is interested in refrigerator-freezers. This is advanced as a crucial step in obtaining useful responses from focus groups (Axelrod, 1976). The moderator also stressed that there were no right answers involving the product and that differences of opinion could be expected since consumers have different needs and tastes in products. A general question was then asked: "What kinds of things do you think about or look for in refrigerator-freezers?" From this point, the discussion and its direction was mainly determined by the responses of the housewives. The order of features brought up by each group is presented in Table 3, and a selection of quotes regarding them are shown in Table 4. A lack of reliability does exist here and should be recognized. In the focus group situation, it is impossible to control for all the various cues that might occur prompting certain responses, such as the effect of who talks first. Nevertheless, it was felt that the order of discussion might provide insight into what general categories of attributes consumers considered first and even which specific attributes were most important. The actual quotes indicate how they feel about the products as well as how they are evaluated.

Overall, both groups viewed refrigerator-freezers as something more than just a functional piece of machinery.

TABLE 3

Summary of Characteristics of Refrigerator-Freezer by Order of Discussion

High Education Group	Low Education Group
1. sources of information	1. frost free
2. frost free	2. icemaker
3. energy use	3. water dispenser
4. price, costs	4. vinyl door coverings
5. ice maker	5. shelves
6. shelves	6. color
7. vegetable bins	7. service
8. meat tray	8. maintenance agreement
9. size	9. warranty
10. location of freezer	10. shopping around-process
11. expected life	11. brand name
12. rollers	12. size
13. service*	13. expected life
14. maintenance agreement	14. costs*
15. warranty	15. energy*
16. textured steel door	16. sources of information
17. color	
18. salesmen	
19. shopping around-process	

*characteristic suggested by group leader

Their concern with its appearance and style imply that it is a part of their home--an integral piece of furniture. Consequently, dimensions of importance seem to be more varied than one might initially expect. Several other characteristics were common to both groups. The main feature which all of the housewives considered "necessary" was frost free. This is a feature whose benefits have been stressed by manufacturers and which certainly reduce work time. However, what has not been easily available in the consumer

TABLE 4

Focus Group Interview Quotations

High Education Group	Low Education Group
ENERGY	
"I would be interested now in what kind of energy savings are available."	"I have an energy saver I don't understand at all, new little hickey, something about when the weather is damp you do something. Gave you a whole book on it, you know I never even read that and never mashed the little hickey."
"...supposed to be listed on the little fact sheet."	"Some say adjust the temperature control."
"I look in Consumer Reports."	"Too many other things."
"I keep very close track of how many kilowatts per hour we use."	"If automatic-OK-but don't want to do it."
"We contradict ourselves because I want that (i.e., frost free) but I know in fact it is one of the biggest consumers of energy."	"Have to save alot for me to mash the button."
"Depends on whether you want to use that energy (i.e., electricity) or your own energy (i.e., manual defrost)."	"Got to be something you plug in and is automatic."
"It's not exactly energy conscious--more cost conscious."	"I don't want to waste energy."
	"Pay more for energy savings, but won't read a book."
	"Don't want a course on how to save energy."
	"Couldn't understand them books anyway."

TABLE 4 (continued)

High Education Group	Low Education Group
INFORMATION SOURCES	
"Consumer Reports"	"Just being involved"
"I would go to a consumer information outfit."	"Experience"
"Labels"	"I watch commercials"
"Neighbors"	"Salesmen"
"Shop Around"	"Having used the product"
	"Husband handles the complex stuff."
FROST FREE	
"It is the number one thing I would look for."	"Don't like to defrost"
"Desirable" but "uses alot of energy"	"Food doesn't spoil"
"One third more"	"Dries food out"
"Essential"	"Didn't know they made any that aren't frost free."
PRICE/QUALITY	
"$300-$800"	"Reasonably important. Don't think I'd buy teddy bear brand."
"If you put a fair amount of money into it to begin with, it should last that long."	"Have to know the brand."
Quality is "not that difficult" to judge.	"Yes--differences in quality--commercials make us think this."

TABLE 4 (continued)

High Education Group	Low Education Group
"Go to Consumer Reports"	"Wouldn't borrow money to get a better one."
"If you go to a major brand, you'll get a good product, pretty much so. Smart to compare on prices. Someone may be having one whing ding of a sale."	
ICE MAKER	
"Gimmick"	"Don't spill water anymore."
"Tremendous luxury"	"My mother has one."
"Saved my marriage"	"Sore subject" (i.e., filling trays)
"That's an extra energy consumer too."	"Ice trays don't last, and they pinch my fingers."
"Problem with city water (clog up and corrosion)	"Uses more electricity but it's worth it."
	"Doesn't make ice fast enough."
SIZE	
"Important"	"When they say 20 cubic feet you don't get that much."
"Mine holds 150 pounds."	"Just some rigamarole they throw in" (i.e., cubic feet)
"What's the largest you can get? That's it."	"I have to see it."
	"I have to look at it to see if it will hold my groceries."

TABLE 4 (continued)

High Education Group	Low Education Group
LIFE	
"15 year average"	"Keep it 15 years."
"Depends on money you pay."	"Every brand varies."
	"Doesn't last as long anymore."
SERVICE	
"I would consider that dependability."	"So important where you buy it."
"$15 to walk in the door"	"Would pay a little more for my appliance to but it from somewhere with a good service department."
"I don't personally think that those service contracts are that beneficial."	"If salesman proud of it, he'll tell you."
"Lottery"	"Like doctors charge you so much."
"Gamble"	"It's like insurance" (i.e., maintenance agreement).
SHOPPING	
"It's surprising how when you do go in to buy a major appliance you need to be informed."	"Shop--get pamphlets and prices and go to next store."
"Think for yourself."	"I don't want any paper. I have to look at the item."
"Read up on it" yourself (i.e., product).	

environment to date is the cost, both in terms of energy and price, for the feature. It will be interesting to see if reactions change when such information is made available. Other strong selling points were adjustable shelves, rollers, and various practical inside design features. In both groups, price did not seem to be an overriding factor. Most subjects felt there was a price/quality relation (i.e., higher prices indicated better quality products), and they expressed a predisposition to pay the money necessary, within their budget constraints, to get "good quality."

Significant differences between the groups were found in responses to information sources and energy and service related matters. A premium was placed on outside sources of information by the HEG, especially publications such as Consumer Reports. It was generally felt that a consumer should be prepared before he goes into the store. On the other hand, the LEG tended to rely on advertisements, especially T.V., for some information, but they mainly felt that in-store personal inspection was most important.

The differences on energy and service dimensions were of the same magnitude. Energy was a subject brought up early and often by the HEG. As a dimension, it seemed to be given careful consideration in the evaluation process. On the other hand, the subject of energy was not brought up at all by the LEG group, and was discussed only in response to the moderator's question late in the session. It appeared to be a subject they did not want to deal with as consumers.

Service costs also showed considerable variability in response. Both groups appeared to be concerned with it. However, the general feeling seemed to be that there was little they could do about service expenses except try to buy from a dealer with a reputable service department. A strong correlation appeared to exist in the minds of the subjects between service cost and warranty and service contracts. The HEG group favored the warranty, and felt the service contract usually was not worth the money. But, the low education group tended to feel just the opposite, to the extent that one housewife expressed a desire to dispense with the warranty and rely only on the service contract.

The results, while obviously not generalizable to the population, did prove helpful in structuring the experimental tasks and instrument. It provided information in terms of consumer language, knowledge, and attitudes toward refrigerator-freezers. Overall, the HEG tended to see things in a more multidimensional fashion, recognizing and dealing with both costs and benefits. The LEG dealt primarily in feature benefits. While there may be any number of reasons for differences such as this, a contributing factor may be the complex nature of cost information. That is, some consumers may find the lack of standardization of objective information (i.e., cents per kilowatt hour, cubic feet, etc.) to be too complex to deal with. The result may very well be that they ignore it altogether. If this is true, it provides an argument for the LCC approach which emphasizes the cost dimension, and places it in a consistent framework.

Presentation of Hypotheses

The results of the focus group interviews coupled with the general problem framework of Chapters 2 and 3 provide the basis for the following hypotheses.

Hypothesis 1: The Presentation of Life Cycle Cost (LCC) Information Will Change Consumer's Overall Satisfaction with Models of Refrigerator-Freezers

It is expected that the presentation of LCC information will impact on consumer satisfaction (i.e., how well a particular model meets both family and budget considerations) in two ways, which can be expressed as subhypotheses:

Hypothesis 1a: The presentation of LCC information will increase the level of satisfaction for models including energy saving features and decrease the level of satisfaction for models without energy saving features

Hypothesis 1b: Subjects presented with LCC information will show a greater discrepancy in levels of satisfaction between models with energy saving features versus those without.

An article by Monroe and LaPlaca (1972) provide a rationale for the expected differences between the LCC and energy/year conditions. They report that results of past studies indicate that information presented in greater levels of aggregation will have more impact than information presented at lower levels.

LCC, of course, presents both energy and service cost data in total over the product's expected useful ife. Consequently, consumers receiving LCC information will be better able to recognize the magnitude of energy and service costs. It is expected that concern with operating costs should subsequently increase. Those models that include energy saving features and have fewer energy consuming features will increase in attractiveness, while the attractiveness of models (features) that use energy will decrease. Subsequent convictions that "energy saving" models are more satisfactory for consumer's home and budget relative to the more convenience oriented models will result.

Regarding expected differences between LCC and control, the presentation of LCC information provides the consumer with the opportunity to establish a more analytical and accurate framework for evaluating products on a cost basis. Cost information is presented within a common time frame, and the components have a consistent unit of measure. These factors coupled with the increase in objective cost data will allow consumers to make finer distinctions between models and to perceive larger differences on the basis of the more objective cost information.

Hypothesis 2: The Presentation of LCC Information Will Improve Consumer Perceptions, Knowledge, Views, and Choices of Refrigerator-Freezers and Features

This hypothesis further reflects the idea that the impact of new product cost information may be measured in more ways than purchase intentions or product choice. The following subhypotheses state the expected relationships more precisely.

Hypothesis 2a: The presentation of LCC information will increase consumer awareness and the accuracy of their perceptions of the life of an average refrigerator-freezer and the costs involved in the owning and operating of the product.

Hypothesis 2b. The presentation of LCC information will improve consumer recognition and recall of product features' operating costs but reduce consumer's ability to recall price.

Hypothesis 2c. The presentation of LCC information will increase consumer "liking" of energy saving features and decrease their "liking" for energy consuming convenience features.

Hypothesis 2d. The presentation of LCC information will increase the proportion of consumers choosing energy saving features and decrease the proportion choosing energy consuming convenience features.

Major variables of consideration in the first subhypothesis are the life of the model, price, and operating costs (i.e., energy, service). These variables make up the major dimensions of the LCC concept, but only price is easily available to the consumer for decision making purposes. Following the availability of full cost information regarding individual features, it is expected that the awareness of consumers regarding the magnitude of energy and service costs for a refrigerator-freezer will be increased. Also, consumers should have more accurate perceptions of the life of an average refrigerator-freezer and the relationship between product price and operating costs. These results are a function of information availability and the conceptual framework the cost data is presented in. For example, the relationship between price and energy costs is put in better perspective. Currently, the usual methods of presenting energy costs (e.g., dollars/month or in kilowatt hours) make it relatively easy for the consumer to view price as being of greater magnitude than energy cost. This would result from the consumer thinking of both costs within a single time limit. That is, the consumer may pay $450 for a unit, but the energy costs are only $1.47; therefore, price is obviously a greater consideration. The presentation of LCC puts price and energy on comparable scales so that the relationship is now seen as $450 price and $540 energy costs.

The second subhypothesis is concerned mainly with consumer knowledge of feature costs and their recognition and recall of specific cost/feature relationships. Major variables are again price and operating costs. Even though consumers exposed to LCC information cannot be expected to understand or even recall the information in its full flavor, the fact that it is available and presented in a unique but logical and consistent format will cause consumers to spend more time evaluating such information in relation to the decision making task. This increased interaction with the cost data will produce differential results in favor of those exposed to the information. However, because of the absolute increase in the amount of cost information present in the LCC condition relative to the control group, it is also expected that consumer recall of feature prices will be less accurate in the LCC group. This is seen as a function of the increased information and the uniqueness of being faced with more than one dollar figure for evaluation.

Because of the increased awareness and recognition of cost information and its relation to product features, consumers will have a better perspective of how much certain convenience features actually cost them, and how important energy saving features are. These dimensions can then be assessed relative to the advantages convenience features offer and the disadvantages incurred by the initial outlay for the energy saving features. The result of this assessment will cause some shift in consumers' liking for product features and evaluations toward the energy saving features and away from the energy consumers. Also, there will be a shift in measures approximating purchase behavior in the same direction. However, it is not expected that these shifts will be universal or tremendously strong given the constraint of limited and initial exposure to the information.

Hypothesis 3: The Presentation of LCC Information Will Lead to Consumers Being More Certain About Their Choices and Viewing the Information To Be Helpful, Though Also More Complex

Variables such as consumer certainty, complexity, and helpfulness are important in both a general product information sense and a policy sense. Basically, one is referring to consumer feelings about the product information. An understanding of consumer feelings along these dimensions can provide valuable insight into how important the information was to them (and will be in the future) and even the extent to which it was utilized or evaluated by the consumer.

Since the LCC condition will have more cost information available to them for evaluation and comparative purposes, it is expected they will feel somewhat more certain about judgments concerning what features they would include in a model. Also, because the cost information regarding energy and service costs will be new to them and presented in a useful and logical format, it is also expected that the consumers receiving such information will judge it more helpful than those who receive only the traditional price data and a verbal explanation of the energy and/or service saving properties of specific features. The LCC group, of course, will receive full cost information and the control group only price and and a brief description of the features with no objective cost data. However, because of the increased number of dollar figures (i.e., price v price + energy cost + service cost + total cost), it is reasonable to also expect that the more extensive information will be judged more complex to handle. This factor is further accented by the uniqueness of format, time frame, and even the very association of dollar costs attached to the energy and service dimensions.

Hypothesis 4: Consumer Response To Cost Information Will Be Affected By Educational Level

Because of the increased cost information available with the presentation of LCC data and the interactive relationship of the components, it is expected that those consumers with higher levels of education will differ from lower educated consumers in various areas of response. The exact relationships can be delineated by the following subhypotheses:

Hypothesis 4a: As educational level increases, the accuracy of consumer perceptions of what it costs to operate an average refrigerator-freezer will increase.

Hypothesis 4b: As educational level increases, consumers will view the cost information as more helpful and more complex.

Hypothesis 4c: As educational level increases, consumer satisfaction with energy efficient models and relative dissatisfaction for energy inefficient models will increase.

As educational level increases, the ability of consumers to recognize and understand the interactions of the cost dimensions, to make more complete evaluations of features, and to recognize the contributions of the features to the overall cost of the refrigerator-freezer will increase. Consequently consumers with more education will find the information more helpful in evaluating feature alternatives and in making finer discriminations between features. At the same time, they will be more likely to recognize the complexity of the information.

The ability to recognize the contribution of the features to the overall model cost allows consumers in the higher educational strata to be relatively more accurate in their perceptions of operating costs of the average refrigerator-freezer. These assets will translate to an increased satisfaction with energy efficient models (and dissatisfaction with inefficient models) on the part of the higher educated consumer because of the greater overall ability to use the new product information.

Hypothesis 5: Consumer Evaluation of Cost Information Will Vary with Household Earnings, Number of Children, Age, and Education

This hypothesis reflects the assumptions that consumers' needs, wants, and means vary. Because of this, consumer evaluation of features and related costs will also vary. The directional relationship can be seen in the following subhypotheses:

> Hypothesis 5a: As age, income, education, and the number of children living at home increases, consumer evaluation of the magnitude of energy costs relative to price will increase.
>
> Hypothesis 5b: As consumers' earnings and number of children increase, evaluations of models and features which increase convenience and reduce work time will increase, but as age and education increase there will be a decreasing favorability toward such models and features.

An interaction between age, education, income, and children can be expected. For example, as age increases to a certain point, income also increases, but older consumers are less likely to be highly educated. In order to judge the effects of each variable on consumer evaluations, the influence of the others will have to be partialed out. Once this is done, certain relationships are expected to hold.

In the case of all four relevant demographic variables, evaluations of the magnitude of energy costs relative to price will increase as the variable increases. Older consumers are more likely to own a unit bought several years ago and without the inflationary pressures of today. Their concern now is with the increasing energy costs which they still pay every month. Consequently, these costs are likely to be perceived as higher. As education increases, the ability to recognize the magnitude of energy costs will also increase. Finally, as both income and number of children living at home increases, there is a tendency to purchase larger units with more convenience features. And, the larger the models and more convenience features mean higher energy costs.

However, as income and children increase, it can also be expected that the evaluations of these larger models and convenience features will increase. Consumers in higher income brackets feel they can afford the cost. This is especially true if the decision is between including and not including a convenience feature. Their attitude will tend to be that they have earned such convenience, and they should have them. Also, higher income groups may entertain more and feel a greater need for such energy consuming convenience features as frost free, automatic ice maker, and ice and water dispenser.

The response of households with children is much the same as the higher income groups but for different reasons. Larger size becomes an important factor in order to keep a large family in food as well as to cut down on grocery store trips. Convenience features such as the ones listed above are viewed as a necessity in order to free the mother for more important jobs and make the children more self-sufficient in the cold drink area. Consequently satisfaction with such features in meeting the needs and wants of both the upper income and larger family members will be high.

The response of older consumers and more educated consumers will be just the opposite. Evaluations of energy consuming models and features will decrease (and subsequent increasing favorability toward energy efficient models and features). This occurs because older consumers are more likely to have greater financial burdens or be on fixed incomes so that factors which reduce monthly expense are looked upon more favorably. In the case of higher educated consumers, they will be more likely to recognize the magnitude of energy costs and the contributions that such convenience features as frost free make.

Research Design and Control Procedures

The research design chosen to investigate the above hypotheses is the posttest-only control group design of the form:[2]

```
R  X 0   (LCC)
R  X 0   (Energy/year)
R    0   (Control)
```

---

[2] The symbol "R" is used to indicate random assignment to separate treatment groups. Since intact groups were used in this experiment, the random assignment was made within each intact group.

This design is one of three true experimental designs discussed by Campbell and Stanley (1963). The other two are the pretest-posttest control group design and the Solomon-four. The posttest only design was chosen for a number of reasons.

First, while the pretest is a traditional concept in experimental research, it is not essential. All three control for the sources of internal validity. Also, by using the posttest only design, the number of groups needed is reduced from four to two comparing it to the Solomon-four. This is an advantage because of the number of subjects the author could use for this study. Finally, while both the Solomon-four and the posttest-only control for the interaction of testing and treatment (i.e., a source of external invalidity), the pretest-posttest design does not. Therefore the posttest-only seems more suitable for this study than either of the other two true experimental designs.

The primary concern of the dissertation and subsequent testing of hypotheses is in the evaluation of differences between LCC and control. The LCC concept represents the most comprehensive and unique presentation of cost data, the merits of which have been discussed in detail in Chapter 3. The control condition approaches the information environment as it exists today. The inclusion of the energy/year condition was a secondary consideration because of the upcoming implementation of the requirement of such data on refrigerator-freezers in the near future. Consequently, the analysis of the results will focus on LCC versus control. Appendix I will be used for discussing the results of the energy/year group and the policy implications of energy/year versus LCC.

Two factors should be noted regarding the application of this design to the actual study. Strictly speaking the control group will not be a control group in the true sense of the concept. This group will receive a stimulus (i.e., price). However, since this situation is representative of the current information environment and is the group being used as a baseline for seeing if changes occur, it will be called a control group rather than a no-energy group. Second, an attempt was made to obtain different types of consumers for the study. The subject population came from women's groups in the Gainesville, Florida, area. The groups varied from small church groups to local civic and theater organizations. In addition, demographic profiles within the groups also varied. Also, random assignment of subjects between treatment and control groups was done so that the random equivalence of the groups themselves was not jeopardized.

Besides the random assignment between groups, other control procedures were incorporated. Standard experimental control procedures were utilized to as great an extent as possible. That is, subjects were encouraged not to compare answers, not to move ahead in answering the questionnaire, etc. However, since townspeople of varying demographic profiles were used, a tradeoff had to be established between control and alienating the subjects. This was done by providing a relatively comfortable atmosphere within which to work and to stress the fact that subjects were not being tested. Also, moderators were present to handle subject questions and to generally make them feel comfortable, free from anxiety, and to keep the respondents from becoming frustrated with a hard task. The sterile control of a true experimental setting was not present. However, it is felt by this author that, in this situation, any sacrifices made in a control sense (e.g., involvement of moderators in keeping subjects from becoming frustrated, conducting the study over a two-week period, etc.) are more than made up for by the increased probability of having subjects in a "good" frame of mind while working through the experiment.

Sampling

The research design and control procedures used were partially a function of the sample used in the study. This is very apparent from the above section. It was considered crucial to have subjects which could reflect the current state of the environment. That is, given a subject of this nature--the introduction of new product information concerning durable goods--it was crucial that the subject pool be made up of those consumers with experience and concern for the product. Consequently, housewives composed the sample. Certainly, a study on the impact of new product information regarding durable goods done with students would have been much less useful in a policy sense and certainly further removed from concern with the problem itself.

Therefore, in order to provide as much generalizability as possible, housewives were used in the study. A local research center elicited subjects from various women's groups in the Gainesville area. Among the club's participating were church groups, theater groups, women's clubs, and Chamber of Commerce auxiliary groups. Obviously these were intact groups, but an effort was made to obtain consumers of varying demographic profiles. This was accomplished by the varying nature of the groups themselves and by recruitment within each group. This effort did produce a good range of demographic profiles on such variables as age, education, earnings, and number of children living at home. Subjects were not asked to give exact answers to many of the demographic questions, but rather to indicate the range which applied to them. Subjects varied in age from the 18-22 year range to 65 and over. Education varied from less than a high school education to more than college. Earnings varied from less than \$5,000 to over \$20,000. And, the number of children ranged from none to eleven. In all cases the end points had the fewest number of subjects and the middle ranges the largest. In addition, 12% of the sample was composed of black consumers.

Subjects were assigned at random to treatment and control groups. Basically the same distribution pattern holds for the three conditions' demographic composition.[3] It should also be noted that no one intact group dominated the sample. There were seven groups with a range from 9 to 23 members. The total sample size was 94. The distribution of subjects by groups was 33 in the LCC group, 30 in the energy/year groups, and 31 in the control group. A contribution of two dollars per participating subject was made to the group for the participation of its member.

Conduct of the Experiment

The conduct of the experiment was an especially important factor in this dissertation. For example, care had to be taken not to bias consumer responses to particular dependent measures by questions preceding those tasks and aimed at other hypotheses. The purposes of this section relate to those factors involved in tying the hypotheses to the actual experiment. Purposes include:

---

[3] Chi square analyses showed no significant differences between conditions on demographics (Age: $\chi^2=7.79$, 14 d.f., $p<.9$; Education: $\chi^2=8.12$, 14 d.f., $p<.9$; Income: $\chi^2=7.11$, 8 d.f., $p<.6$; Children: $\chi^2=8.63$, 12 d.f., $p<.8$).

(1) Providing an outline of the physical experimental procedure used in testing the hypotheses.

(2) Tying the hypotheses and subhypotheses to the section of the experiment designed to test them.

(3) Providing operational defintions of concepts for testing the hypotheses and subhypotheses.

Because of the utilization of intact groups and the large sample size, the experiment was conducted over a span of two weeks. Each group was met with separately. In this way, subjects could be tested at places and times convenient for them. It is felt that this procedure put subjects more at ease and in a better frame of mind for working through a demanding task. The actual experiment was conducted in one sitting. Average time to complete the tasks was a little over one hour. The conduct of the experiment is represented by the flow chart in Figure 3.

Cover Story

The cover story set as the goal of the study finding out what kinds of refrigerator-freezers best suit the needs and wants of today's consumers. It stressed the fact that there was no one "best" refrigerator-freezer which could be produced to satisfy all consumers. Consequently, the point

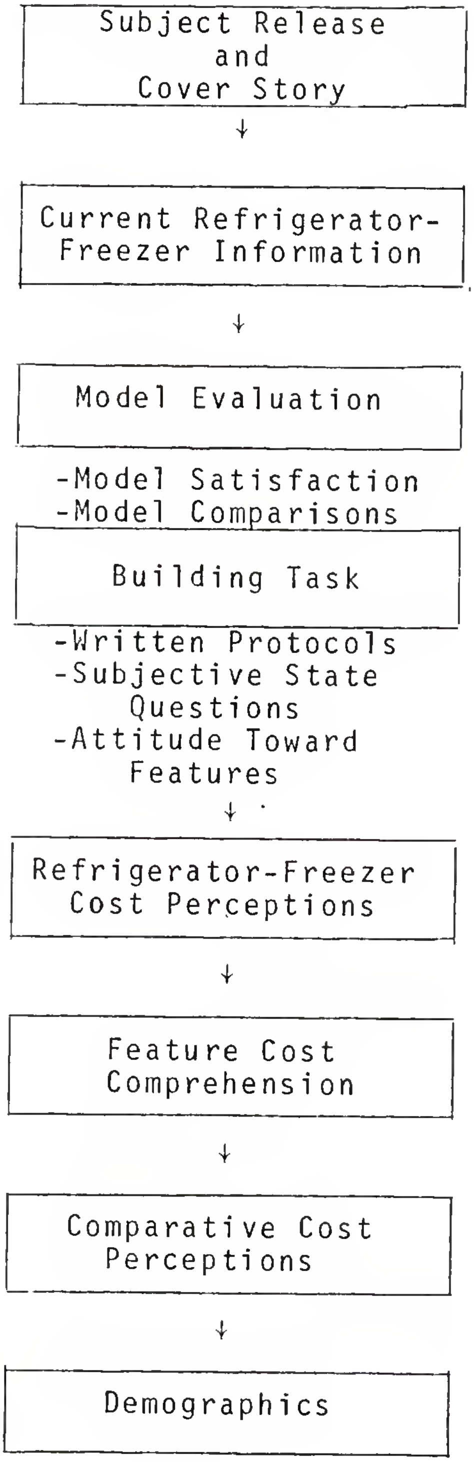

Subject Release and Cover Story
Current Refrigerator-Freezer Information
Model Evaluation
-Model Satisfaction
-Model Comparisons
Building Task
-Written Protocols
-Subjective State Questions
-Attitude Toward Features
Refrigerator-Freezer Cost Perceptions
Feature Cost Comprehension
Comparative Cost Perceptions
Demographics

Figure 3

Conduct of the Experiment Flow Chart

was made that there is no "correct" answer, and the concern is with each consumer's responses in relation to her own family and budget. This approach, along with stressing the point that all questionnaires would be anonymous, served to remove some of the tenseness from the respondents and tended to remove the stigma of being tested, at least to some degree.

Current Refrigerator-Freezer Information

This section was incorporated for several reasons. First, it provided a means for subjects to become involved in thinking about refrigerator-freezers. It also served to give subjects some experience with the various scales for eliciting responses. Finally, it provided background data concerning subjects' current refrigerator-freezer models and those features they currently have. Response to these inquiries were scaled so that not only the information regarding the dimensions could be examined, but also how sure subjects were about their responses. In this way, the investigator could determine how well informed subjects were about various attributes of the product (e.g., size, brand name, etc.).

Model Evaluation

In this task, each group (i.e., LCC, energy/year, control) received a matrix of information. There were six columns labeled "Model 1" to "Model 6." The rows were composed of attributes of refrigerator-freezer models. Cell entries included information about the relationship between models and attributes. Appendix III presents the instrument given to subjects in the LCC condition including the models by attribute matrix. Differences in the instrument by condition are also discussed. Costs were calculated to represent the current environment as closely as possible (Appendix IV). Variation between conditions occurred in the presentation of the cost information. The LCC group received information on all dimensions (i.e., price, life time energy cost, life time service cost, total LCC). The energy/year group received an energy cost/year figure plus a range of electricity costs for similar models and price. The control group received only price information.

A description of all features was given to the subjects. They were then asked to look over the matrix and answer questions about the models. The subjects were able to see the matrix, and consequently refer to it while filling out the scales. The six models represent all realistic combinations of features. Therefore, it is possible to evaluate the effects, if any, of the cost information and features on consumer response.

Subjects were asked to respond to six seven-point bipolar scales defined with contrasting adjectives at each end and numbered +3 to -3 and six five-point bipolar scales containing the same characteristics. The first set of six scales (one response for each model) elicited subject ratings of _each_ of the six models in terms of how _satisfactory_ it would be in meeting the needs, wants, and budget of the subject's family. End points on the scale ranged from very satisfactory (+3) to very unsatisfactory (-3). The second set of scales allowed subjects to rate each of the models only in _comparison_ to the other models. A five-point scale was incorporated for this purpose (Best of the Six To Buy, Good But Not the Best, O.K.--Not Particularly Good or Bad, Bad But Not the Worst To Buy, Worst To Buy). Subjects were asked to place one check mark on each scale corresponding to their feelings about that model. Stress was placed on the fact that subject response should reflect budget considerations and not just the consumer's "ideal" model, which may not be realistic in terms of actual purchase considerations.

The incorporation of the two sets of scales evolved from a concern with possible subject misinterpretation of scales. Given only one set of scales, it was felt that some subjects might respond on an absolute basis while others would do so on a comparative basis. Consequently, the two scales were devised. A high correlation is expected, and in the advent that results are highly correlated, analysis will be done on the more traditional seven-point scale.

This task relates specifically to Hypothesis 1, Subhypothesis 4c, and Subhypothesis 5b. It should be noted that the correlation between consumer satisfaction or model comparisons and liking of the models is likely to be a strong one. However, it is possible for a consumer to "like" something _without_ feeling it is satisfactory with regard to family and budget considerations. Therefore, all three scales were incorporated in order to account for various levels of impact on the consumer. Consumer response to these scales provide the dependent measures for the related hypothesis.

Building Task

Following the model evaluation task, subjects were asked to "build" their own refrigerator-freezers. That is, the task involved picking the features they would include in a model of their choice, once again stressing family and budget considerations. Subjects were given a folder with four articles in it--directions, a posterboard model, a sheet of pull-off tabs with the names of various features and appropriate cost data on it, and a sheet for written protocols (Appendix III).

The directions were on how to "build one's own refrigerator-freezer." In this case, it was simply a matter of pulling a tab with the appropriate feature on it and placing it on the model beside a number. Features were listed on the page in approximate descending order reflecting what feature would normally be considered first. Consumers could change their minds by simply pulling off a tab with the feature they decided was better and placing it over the original choice. The models and numbers were arranged so that subjects could keep a tally on costs as they were building if they so desired. Features were placed directly below each other and associated costs formed a vertical column. Those features that actually saved the consumer's money had the word "save" above the dollar figure, so subjects could tell which features saved them money, in terms of dimensions like energy, as well as how much the features cost. Examples of these tabs for the LCC group and control can be seen below and in Appendix III.

	PR	EN	SER	LCC
FROST FREE	$80	$470	$40	$590

	PR	EN	SER	LCC
ENERGY PACKAGE	$125	SAVE $250	SAVE $10	SAVE $135

FROST FREE	PR $80

ENERGY PACKAGE	PR $125

The abbreviations for the cost data were explained in the directions. Consumers were asked to spend a few minutes looking over the features before actually pulling the tabs. Subjects then "put on their hard hats" and began building their own refrigerator-freezers.

After subjects finished building the model, they were asked to fill out a sheet labeled "How And Why I did It My Way." The sheet contained the 11 features (size in cubic feet, side by side doors, top freezer door, color, frost free, adjustable shelves, automatic ice maker, ice and water dispenser, energy package, service contract, and rollers) the subjects had to choose from. They were asked to briefly explain why they did or did not choose each particular feature. At the bottom of the page was a question about whether or not they changed any of their choices, and if so, why.

In all but three cases, consumer choice involved a purchase-no purchase decision. For example, the choice on automatic ice maker was either to include the feature (i.e., pull the tab that said Automatic Ice Maker) or not include the feature (i.e., pull the tab that said No Automatic Ice Maker). There were costs attached to the feature. But, if a subject chose not to include it, there was "No Extra Cost."

The baseline feature was size, represented in cubic feet. There were six available sizes ranging from 14 cubic feet (normally found in apartments) to a huge 25 cubic foot model. Consequently, the consumer who chose a 16 cubic foot model with a price of $300 and no automatic ice maker would still be charged $300 since this figure represents the base price. However, if he included the ice maker, the price would go up to \$375 (\$75 = price of the feature). Another feature that did not have a purchase-no purchase choice attached to it was frost free. The option, in this case, was frost free or manual defrost with the manual defrost carrying the "No Extra Cost" tag. The only other feature not carrying the purchase-no purchase decision was freezer location. The two options were side by side or top (top being the "No Extra Cost" option).

This rather complicated task was chosen because it was felt that it would involve the subjects more in the experiment. Since actually buying a durable good such as a refrigerator-freezer is a high involvement situation, it was felt that increased involvement by the subject was a necessary goal. This was accomplished by having the subject engage in a task (i.e., building his own refrigerator-freezer) that would require greater effort than the more traditional paper and pencil questionnaire response.

Consumer response to the building task and the written protocol sheet provide the basis for testing Subhypothesis 2d and Subhypothesis 2b respectively. The subject's indication of which features she would "choose" for her model, by pulling the appropriate tab, form the basis for testing the effect of LCC information on consumer "choice" of product features. The open-ended responses of subjects provide useful insight for evaluating consumers' reasons for choosing or not choosing various features, especially in light of available cost data. Consumer response to these two tasks represent dependent measures for testing the subhypotheses.

Subjective state questions. Following the building task and the written protocols, subjects were asked to respond to several questions directly relating to the just finished task. The first set were three subjective state questions and an open-ended question referring back to the actual building task. The subjective state questions were seven-point bipolar scales with contrasting adjectives at each end. Jacoby et al. (1974a) used similar questions, and they were shown to provide additional insight into assessing the impact of information on consumers. The first question asked the subject how certain he was that he made the best judgment regarding what features to include in his model. End points were "Very Uncertain" and "Very Certain." The second question asked how helpful the cost information was in feature evaluation. End points were "Very Helpful" and "Very Unhelpful." The final scaled question had to do with perceived complexity of the cost information. End points were "Very Simple" and "Very Complex." The open-ended question asked the subject what other information, if any, she would like to have received while building her model.

The subjective state questions bear directly on the testing of Hypothesis 3 and Subhypothesis 4a. Both are concerned with the consumer's feelings about the cost information and the interaction of the components. In the first case, the perceived helpfulness, complexity, and certainty of judgment is a function of the presentation of the cost information. In the latter case, another contributing factor is expected to be educational level. The subjects' checking a point on each scale represents the dependent measure for testing the above hypotheses. Certainty, complexity, and helpfulness are operationally defined as the consumer response on each scale.

The open-ended question represents one measure used to test Subhypothesis 2a, concerned with consumer awareness of alternative feature costs. In this case awareness is operationally defined as the consumer's open-ended response to the question, "What other information would you have liked to receive while building your own refrigerator-freezer?"

Feature evaluation. Following the subjective state questions, subjects were asked to evaluate the features they had to choose from. Each feature was followed by a five-point scale representing degrees of "liking" for the product feature. Subjects were asked to check the scale point most closely corresponding to their true feelings.

Because it was felt that most subjects would exhibit some positive feeling for the features, the scale was weighted on the positive side. That is three of the scale points represented degrees of goodness, one was neutral, and one was unfavorable (i.e., Like The Feature A Great Deal: A Must To Have, Very Good Feature, Good Feature, Don't Care If I Have The Feature Or Not, Dislike The Feature). Consequently, the scale does not represent an interval scale but rather an ordinal one and will be analyzed as such.

Consumer response to each of the features represent dependent measures for Subhypothesis 2c. Liking is operationally defined as the subject's response for each product feature on the "liking" scale. It should be stressed that response here does not necessarily represent what the consumer would do in terms of purchase behavior or latter stages in the hierarchy. The fact that consumers have a favorable feeling toward an attribute does not, in all cases, translate to purchase.

Cost of Features

This task was presented to the subjects after several other questions had been asked between the building task and this one. The concern is with the cost information. The control group response represent what subjects know going into a buying situation, and the LCC group responses what is learned from the availability of cost information.

Subjects were asked to match six features (adjustable shelves, automatic ice maker, frost free, ice and water dispenser, side by side doors, energy package) with one of a range of costs. There were nine cost ranges to choose from, and subjects were allowed to match more than one feature with a range. Four kinds of costs were presented (life cycle cost, lifetime energy cost, energy cost/year, and price). Therefore, subjects had to determine the cost of each feature under four different cost types (e.g., life cycle cost of frost free, price of frost free, etc.). Each list of cost ranges, under the particular cost concept, numbered nine. Two of the ranges represented cost savings as opposed to expenses. Subjects responded by placing the feature number by the cost range they felt best represented the cost for that particular feature. In all, subjects made 24 responses (six features x four different costs). A complete reproduction of the instrument can be seen in Appendix III.

Five additional questions were asked. After responding to a particular cost group, subjects were then asked to state how sure they were that the answers they gave were correct. This was done by marking the scale point on a seven-point bipolar scale that best represented their feelings on the matter. The end points were "Very Sure" and "Very Unsure." The final question asked the subject to indicate which cost more over the life of a refrigerator-freezer--

price or electricity. Subjects responded by checking the box next to their choice.

The task involving identifying cost ranges for features is used in testing Subhypothesis 2b, and responses to the task represent dependent measures for the hypothesis. It was decided the consumer response measured dichotomously (i.e., right-wrong) would be too stringent a test and that some of the information effect was lost in this case also. Therefore, the mean absolute deviation (MAD) from the correct response was used. In this way, measures of how close the subjects were to the correct answer could be analyzed. This could then be compared with their perceptions of how well the consumers thought they recognized or recalled the cost information.

The subjects' response to the question of which costs more--electricity or price--is a partial test of Subhypothesis 2a, and it is concerned with consumer evaluation and accuracy of the relationship between operation costs and price. Operationally this dependent measure is a nominal scaled response indicating their perceptions of which dimension cost more, and will, therefore, be analyzed using appropriate nonparametric techniques.

Refrigerator-Freezer Cost Perceptions

This task was set up to force all subjects to think about two types of costs--owning and operating. The major concern was with recognition and accuracy of consumer perceptions regarding such factors as price, energy, and service costs. The introduction to this task made the point that some people feel a product's total cost is an important factor in decision making regarding durable goods. An example was given using cars as the product. Important costs were given as price, cost of gasoline, taxes, replacement parts, etc. Subjects were then asked to think about the costs involved in owning and operating an average refrigerator-freezer. They were asked to give their perceptions of what it costs to own an average refrigerator (i.e., price), what it costs to operate one, and their perceptions of the useful life of an average model. In addition, open-ended questions asking subjects to list, in order of magnitude, the main factors involved in the cost of operating a refrigerator-freezer was provided.

Responses to these questions were used as dependent measures to contribute to the testing of two hypotheses. Specifically Subhypothesis 2a and Subhypothesis 4b were the major concerns. Accuracy of perceptions is operationally defined as consumer response to the specific questions at the beginning of the task. The consumer recognition of the various operating costs were analyzed by responses to an open-ended question at the end of this task. Operationally defined, it is the consumer's free responses to the open-ended question. The responses to the question were categorized according to energy and service factors, other (e.g., family size, gaskets, etc.), combination of energy and service and other, and do not know.

Comparative Cost Perceptions

In an extension of the cost perception task just discussed, this part of the experiment was set up to explore the ability of consumers to deal with the cost information in a decision making framework. It was decided not to just give subjects problems to calculate using the cost data. This approach could have caused the subjects to feel they were being tested and probably graded on the questions. If this did occur, it could be expected that subjects would feel "put off" by the task, and a high number of non-responses would result. Consequently, the task was set within the framework of giving elicited advice to a neighbor.

The scenerio included a neighbor trying to decide which model of refrigerator-freezer to purchase--Top Flight or Exclusive. The models are comparable on almost all dimensions. However, the Exclusive model costs somewhat less ($475 v $525). But, the Top Flight has a lower yearly electricity cost ($39 v $45). The neighbor wants to know which model will cost him the least over its life and how much will he save by purchasing that model. Subjects were asked, in an open-ended format, to help their "neighbor" out by answering his questions.

This task was set up to test consumers' ability to make the necessary calculations in order to determine the most efficient model from standpoints other than price only. Results here may be useful in determining which information provision is most effective--LCC or energy/year. Energy/year data would require the consumer to make such calculations while the LCC format would provide them to the consumer. Operationally, consumer response is measured by which model he indicates is most efficient. In the case of the second question, consumer responses will be on a dichotomous scale indicating a correct or incorrect response in terms of the dollar amount saved by purchasing the more efficient model.

Demographics

A series of brief demographic questions were placed at the end of the instrument. It was felt that the total experience of working through the multiple tasks required a great deal of physical and cognitive effort on the part of the subjects. The experiment lasted a little over an hour. The combination of these factors was expected to cause subject fatigue. Therefore, the demographic questions were placed at the end because of the relatively little physical and cognitive effort required by the subject in responding.

Standard demographic questions were asked regarding age, sex, education, household earnings, occupation, marital status, and number of children living at home. Some of these demographic questions relate directly to Hypothesis 5. The concern is with the effects of education, age, and earnings on consumer evaluation of and feelings toward features and cost dimensions.

In the cases of age, education, and earnings, responses involved making a check above the correct figure or range of figures. A range of figures was used in the case of earnings and age so subjects would not be forced to give the exact amount. Education was responded to by circling one of 16 numbers indicating years of completed education. Although some subjects may well have had more than four years of college, the author did not want to cause the lower educated subjects possible embarrassment, resulting in no response to this item. Choices on marital status were married, single, widowed, divorced, and legally separated. Responses to the number of children living at home and occupation were open-ended.[4]

---

[4] The complete demographic section can be seen in Appendix III.

Summary

The experimental procedure and accompanying instrument described in this chapter provides tests for all the hypotheses presented. In addition, various levels of consumer response are covered by the multiple tasks. Each section of the instrument is used for testing one or more hypotheses. Both parts of Hypothesis 1 and Subhypotheses 4c and 5b are tested in the model evaluation task. The building task is used to test Subhypothesis 2b and 2d. The subjective state questions cover Hypothesis 3 and Subhypotheses 2a and 4a. Hypothesis 2c is tested in the feature evaluation task, and the feature cost comprehension section serves as a test for Subhypotheses 2a and 2b. Refrigerator-freezer cost perceptions provide tests for Subhypotheses 2a and 4b. The comparative cost section is used to test Hypothesis 2a, and the demographic section covers Hypothesis 5. The results of these tests are presented and discussed in Chapter 5.

CHAPTER 5

RESULTS AND DISCUSSION

Chapter 4 has provided an in-depth look at the conduct of the experiment and presented the hypotheses to be tested. This chapter discusses the results of the testing. However, the results are of interest in two frameworks. The first is, of course, the extent to which each hypothesis is supported. The second has to do with results in terms of the levels of consumer responses to the information. In a policy sense, the latter provides a valuable perspective of LCC and consumer's processing of such new information. Therefore, the first part of this chapter will present results by hypothesis in order to maintain the sequence of the last chapter. The results will be discussed in the summary section in a more information and policy oriented framework.

Analysis of Results

Hypothesis 1

This hypothesis states that the presentation of LCC information will change consumers' overall satisfaction with various models of refrigerator-freezers. The consumer was asked to evaluate each of six models of refrigerator-freezers and rate it in terms of how satisfactory it would be in meeting the needs and wants of her family budget. A seven-point, -3 to +3, satisfaction scale labeled "Very Satisfactory" to "Very Unsatisfactory" was utilized.

As stated in Chapter 3, this hypothesis was to be tested using two scales--satisfaction and comparison--in order to account for possible differences in consumer interpretation of the scales. An examination of responses indicated the possibility of a high degree of consistency between the scales. Since satisfaction was measured on a seven-point bipolar scale and the model comparisons on a five-point scale, a comparison of raw means would be misleading. An overall correlation between the scales was run. The Pearson r was .83 ($p < .001$). Consequently, the seven-point satisfaction scales were chosen for further analysis in order to avoid duplication of effort.

Hypothesis 1 was broken down into two subareas for analysis. The first deals with group differences in satisfaction with models. The second looks at the judged distance between models in terms of satisfaction levels.

Hypothesis 1a. It is postulated that the presentation of LCC information will increase the level of satisfaction for models including energy saving features and decrease the level of satisfaction for models without energy saving features. In this task, each subject filled out a satisfaction scale for each of six models. In this case, the design closely resembles what Winer (1971) calls a repeated measures analysis of variance (ANOVA)--the application of ANOVA to data in which a single dependent variable is measured on more than one occasion on the same subject. While the six satisfaction scales are not strictly repeated measures, responses will not be independent. "Satisfaction" can be looked at as a single dependent variable measured on the same subject more than once.

The design then contains two factors. One factor, a between subjects factor, is "Information" consisting of three levels--life cycle cost, energy/year, and control. The second factor, a within subjects factor, is "Models," and each of the six models represents one level of the independent variable. In addition to the usual assumptions concerning normality and homogeneity of variance within cells, the repeated measures analysis also requires the assumption of homogeneity of covariances between repeated assessments. A violation of these assumptions will cause artificially high F values resulting in to many rejections of the null hypothesis.

Because of this problem, a procedure which makes no assumptions regarding covariances and yields exact probabilities will be used. This approach is multivariate analysis of variance (MANOVA). MANOVA is an extension of the usual univariate analysis of variance model to a set of response variables rather than just a single dependent measure (McCall and Appelbaum, 1973). This method essentially combines the information in the several response variables in a way which allows the detection of treatment effects.

The mean values for the three groups can be seen in Table 5 and a graph of these responses in Figure 4. The order of the models in Figure 4 represent the presence of energy saving features (M3, M5, M6) or the absence of such features (M1, M2, M4). In addition, each set of three models is ordered from low to high according to energy and total cost. Table 6 presents the results of the MANOVA.

TABLE 5

Mean Values for Model Satisfaction Ratings

Condition	Model Mean Values[a]					
	M1	M2	M3	M4	M5	M6
LCC (n=33)	-1.42	-0.06	-0.42	-0.32	1.55	2.00
Energy/Year (n=30)	-1.41	-0.07	-1.14	0.24	1.14	2.21
Control (n=31)	-1.63	-0.30	-0.50	1.13	0.80	1.47

[a] Scale values range from -3 to +3, with -3 indicating "very unsatisfactory" and +3 "very satisfactory."

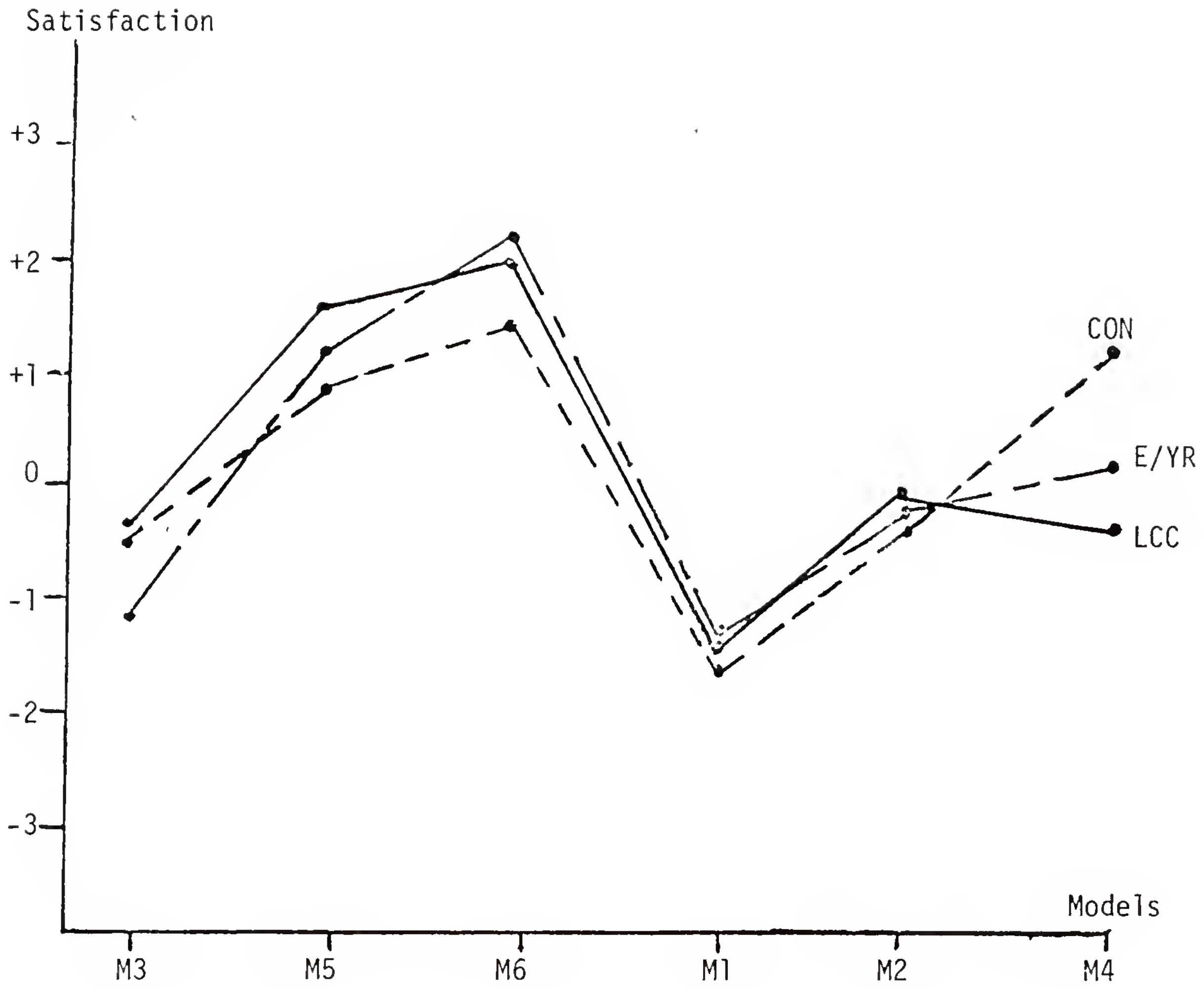


FIGURE 4

Model Satisfaction by Information Level

TABLE 6

MANOVA: Satisfaction Ratings

Source	d.f.	F Value	F Prob
Grand Mean (i.e., within subjects)	5,83	33.67	<.001
M1-M2[a]	1,87	42.33	<.001
M2-M3	1,87	5.54	<.02
M3-M4	1,87	12.66	<.001
M4-M5	1,87	10.78	<.001
M5-M6	1,87	8.65	<.004
Information (i.e., between subjects)	2,87	0.05	n.s.
Information x Models	10,166	2.60	<.006
M1-M2	2,87	0.01	n.s.
M2-M3	2,87	1.37	n.s.
M3-M4	2,87	2.79	<.07
M4-M5	2,87	6.59	<.002
M5-M6	2,87	0.54	n.s.

[a] Mi-Mj represent individual contrasts between model i and model j, as univariate F's. Contrasts can be examined separately only if the overall main effect is significant or a priori. While it is common to employ orthogonal polynovial contrasts, any set of linearly independent contrasts can use used. In this case the set M1-M2, M2-M3,...M5-M6 have been entered into the analysis as dependent variables. These contrasts are linearly independent but not orthogonal. However, the multivariate result is identical to that obtained with polynomial contrasts.

Looking at these results, several facts emerge. The test of the Grand Mean represents the main effect for the Models factor (i.e., repeated measures). A main effect is present ($p<.001$), so individual contrasts can be made. All contrasts are significant. In essence, this result says that regardless of information condition subjects do evaluate the models differently. That is, the average mean value, collapsing across conditions, for M1 is significantly different from M2. However, there is no main effect for Information. That is, collapsing across models there is no significant difference in average satisfaction among the three conditions. This suggests that the features available in the models were more important than the information provided to the three groups.

The most interesting results can be seen by examining the Information x Model interaction (p<.006). The only significant differences occur in contrasts involving Model 4. An examination of the mean values show that the LCC group evaluates M3 and M4 almost the same (M3 = -0.42, M4 = -0.32) and somewhat negative. The control group, however, shows a larger difference. While the evaluation of M3 is close to that of the LCC condition (-0.50), their evaluation of M4 is positive (1.13). The slightly more negative evaluation of M3 was expected since it did not have any convenience features but did have the energy package. It was also expected that M4 would be evaluated more favorably by the control group since it contained both convenience features but no energy package.

In looking at the means for M4 and M5, the differences between LCC and control are further accented. LCC evaluated M4 negatively (-0.32) which is consistent with expectations since M4 is the most energy inefficient model. M5 is evaluated positively (1.55) which was also expected since it is the second most energy efficient model. The control group, on the other hand, evaluates *both* models positively (M=1.13, M5=0.80) and rates M4 *higher* than M5. That is, the control group evaluates the most energy inefficient model more positively than the second most energy efficient model.

The significance of M4 is crucial. It suggests the concern people in the LCC condition had with energy cost. It is also significant that this is the only model where the differences between groups ranged from the positive side of the scale (control) to the negative side (LCC).

An examination of Figure 4 shows that, overall, the three groups evaluate those models with energy saving features (i.e., M3, M5, M6) more positively than models without energy saving features (i.e., M1, M2, M4). The relationships between the energy efficient models is almost linear. Mean values show a linear increase for both LCC and control. Although the LCC group had higher mean values for all three models, which was expected, the differences were not sufficiently strong to be statistically significant. However, it was not expected that the trend would be a linear increase. That is, of the three models with energy saving features, the most efficient was rated least satisfactory.

This relationship is not as pronounced for the models without energy saving features, but it does hold in part. The trend for the control group is linear with the most cost efficient being the model evaluated least satisfactory. The LCC group also rates M1 least satisfactory, but the trend is not linear since M4 is rated more negatively than M2 which is consistent with the hypothesis.

A possible explanation for the low ratings of M3 and M1 and subsequent trends lies in the presence or absence of the frost free feature. M3 and M1 are the lowest rated models of the six. They are also the only two models which do not have frost free features. It appears that frost free appeals to all consumers regardless of condition. M5 and M6 were the highest rated models [LCC: $\overline{x}$=1.55(M5); $\overline{x}$= 2.00(M6); Control: $\overline{x}$=.80(M5), $\overline{x}$=1.47(M6)]. M2 and M4 while not rated as highly as M5 and M5 were also rated more satisfactory than M3 and M1. Overall, it appears that the cost information was not strong enough to covercome the problems and inconvenience of manual defrosting.

Hypothesis 1b. In examining Figure 4, it was shown that regardless of condition, consumers tended to evaluate those models with energy saving features more favorably than those without. Following up on this, an interesting issue involves the difference in evaluations between models with and without energy saving features. It was expected that the discrepancy in levels of satisfaction between models with energy saving features versus those without would be greater with the presentation of LCC information. That is, it is now known that the consumers in the study generally prefer models with energy saving features to those without, although all consumers do prefer the inclusion of frost free no matter what. The issue now becomes one of determining if this general predisposition is made stronger by the availability of LCC information.

In order to test this proposition, within each condition, the average level of satisfaction for each model with an energy package was summed, and the same procedure was done for the models without an energy package. Those two figures were subtracted to yield the average distance between models with an energy package and without (Table 7). A one-way ANOVA with t tests was run. It is apparent from Table 7 that there is a significant difference between LCC and control ($p<.013$). The LCC information enables the consumers to discriminate between energy saving and energy consuming models much more strongly than information available to the control group.

In summary, the conclusion that can be drawn at this stage is that exposure to LCC information affords recognition and stimulation of the value of energy saving features for

TABLE 7

Evaluative Distance Between Energy Saving and Energy Using Models

Models with Energy Package	Mean Values[a]			Distance[b]			F Prob.[c]	t Prob.[d]
	LCC	Control	E/yr	LCC	Control	E/yr		
M3	-0.42	-0.50	-1.14	4.93	2.57	3.45	.034	.013
M5	1.55	0.80	1.14					
M6	2.00	1.47	2.21					
Models Without Energy Package								
M1	-1.42	-1.63	-1.41					
M2	-0.06	-0.30	-0.07					
M4	-0.32	1.13	0.24					

[a] Scale responses range from -3 to +3, with -3 = "very unsatisfactory" and +3 = "very satisfactory."

[b] The distance figures were calculated by summing the mean values for models with energy packages and subtracting the summation of mean values for those without packages within condition.

[c] This figure is the α - level probability for a one-way ANOVA on which variable using thre three groups as levels for the single factor.

[d] This figure is the α - level probability for a t test between the LCC group and control.

the consumer. Also, mean value directions indicate some support for LCC information having a positive influence. However, while mean values were generally in the predicted direction, the cost information in some cases does not appear strong enough to convince consumers to do without the frost free feature. In addition, it appears that the presentation of LCC information does cause consumers to discriminate more between models which have energy saving features versus those that do not.

Hypothesis 2

The second hypothesis states that the presentation of LCC information will improve consumer perceptions, knowledge, views, and choices of refrigerator-freezers and individual features. The different levels of consumer response can be studied within the context of subareas. Consequently Hypothesis 2 is broken down into four subhypotheses.

Hypothesis 2a. It is expected that the presentation of LCC information will increase consumer awareness and the accuracy of their perceptions of the useful life of an average refrigerator-freezer and the costs involved in owning and operating the product. A number of dependent measures were taken in order to analyze consumer perceptions of, and accuracy regarding, the many relationships and attributes associated with refrigerator-freezers.

Interval and ratio scaled data such as that appearing in Table 10 will be analyzed on the same basis as presented earlier. Nominal scaled data which meet the requirements for chi-square analysis will be analyzed by means of the chi-square test statistic. In this case, when n is large, X^2 will possess, approximately, a chi-square probability distribution in repeated sampling. However, experience has shown that the cell counts should not be too small in order that the chi-square distribution provide an adequate approximation to the distribution of X^2 (Mendenhall, 1971). Consequently, for the test statistic to be useful, the expected cell count should equal or exceed five. When this is not the case, percentage responses will be given. All other data meeting the nominal scale properties, except where designated, in this dissertation will be analyzed according to the same criteria.

The lack of consideration of energy cost related information by the control group is a major conclusion of this study. Across a series of dependent measures, taken late in the study, this is consistently borne out. In an open-ended question following the building task, consumers were asked what other information they would like to have received while building their model. The percentage response was almost identical between treatment and control (Table 8). It was expected that the conditions would differ if the control group was aware of the importance of energy in the total product cost. Results do not support this expectation. It should also be noted that the high number of

TABLE 8

Additional Information Consumers
Would Like To Have Had
(in percentages)

Information	LCC (n=21)	Control (n-23)	E/yr (n=25)
Energy and Service	33.3	30.4	24.0
Other	38.2	43.4	40.0
No Additional Information	28.6	26.1	36.0

nonresponses in both conditions (LCC=36%, Control=25%) may partly be due to subjects feeling there was no other information they could use. Therefore, instead of writing "none," they left it blank. There are a number of possible reasons why this might occur, but two seem particularly reasonable. First, the control group may not have made the association between energy and the addition of features. Or, they did not think energy was an important factor in the cost of the product. It is also interesting that the condition receiving the most cost information (i.e., LCC) had a somewhat higher percentage request for additional energy and service data. It seems that once consumers have information that enables them to see the importance of operating costs, they do find such information useful in evaluating alternatives.

The results of a second open-ended question lend support to the possibility that consumers in the current environment do not perceive energy and service costs as significant contributors to product cost. The consumer was asked to list those factors involved in the operation of a refrigerator-freezer. Again, the consistency of response between LCC and control groups is strong (Table 9). Both groups seem equally aware of the cost dimensions. This supports the contention that consumers do realize that energy is a part of operating costs but do not consider it an important dimension. There may be a number of reasons for such feelings. Consumers may be under the impression that they have no control over such costs, or they may feel that the costs are not large enough to worry about.

TABLE 9

Factors Influencing Operating Costs
(in percentages)

Factors	LCC (n=28)	Control (n=25)	E/yr (n=25)
Energy and Service	60.7	72.0	76.0
Other (family size, gaskets, etc.)	10.7	8.0	4.0
Combination of Energy and Service and Other	21.4	20.0	20.0
Do Not Know	7.0	0.0	0.0

The contention that the control group does not appear to consider energy a significant factor in product cost is substantiated by a series of dependent measures testing the accuracy of consumer perceptions regarding product costs. Table 10 and 11 summarize the results of these questions.

TABLE 10

Accuracy of Consumer Perceptions by Dimension

Variable	Mean Values LCC	Control	E/yr	F Prob[a]	t Prob[b]
What it costs to own an average refrigerator-freezer (i.e., price)	$ 718	$577	$578	.15	--
What it costs to operate an average refrigerator-freezer	$1158	$510	$985	.03	.002
Useful life of an average refrigerator-freezer (in years)	13.7	13.4	13.2	.85	--

[a] This figure is the α-level probability for one-way ANOVA on each variable using the three groups as levels for the single factor.

[b] This figure is the α-level probability for a t test between the LCC group and control.

TABLE 11

What Cost Is Greater--
Purchase Price or Lifetime Energy?

Condition	Cost Dimension Response[a] Price	Electricity	Totals
LCC	6 (21.4)[b]	22 (78.6)	28
Control	15 (60.0)	10 (40.0)	25
Totals	21	32	53

Chi-square = 8.84 with 1 degree of freedom
Significance level = .01

[a] The correct response is "electricity."

[b] Numbers in parentheses represent percentage responses.

Perceptions of purchase price did not show significant differences in the ANOVA, but the means are in the expected direction. That is, the LCC group's perceptions are quite a bit higher than the control groups. This was expected to happen for at least two reasons. First, increased input of total cost information may have caused a generally larger perception of individual costs. A second possible reason is that the increase in cost information may have caused subjects to become confused in trying to keep the different costs in perspective. It should be noted that there is no "correct" answer to the price and operating cost questions in Table 10. However, the interactive effects can be placed in a correct framework. That is, lifetime energy costs are higher than purchase price.

A key finding of this study involves consumer perceptions of operating costs. Consumer perceptions are in the right direction and significant (p=.002). The correct perceived interaction between price and energy cost is closer for the LCC condition than for the control group which has underestimated the energy cost for the size of refrigerator-freezer in the $550-$600 range. The $510 lifetime energy estimate comes closest to the baseline energy cost of a 14 cubic foot model (i.e., $480), and this is the size most frequently put in apartments. While price does vary depending on size and features, a general energy cost can be calculated. A model in this price range with no extra features would be between 19 and 22 cubic feet. Energy costs for this size normally range between $830 and $1060. If any features are added, such as frost free (which almost all subjects did include), energy costs increase by $470 at least. For example, the lifetime energy costs for a 19 cubic foot model with frost free would be about $1300 (i.e., $830 for basic box plus $470 for extra energy used by frost free). Thus the control group answers must be in error, probably by a factor of two or more. This supports the earlier premise that the control group does not feel energy is a large factor in product cost.

Another key result supporting this premise can be seen in Table 11. The control group indicated that "price" was significantly more than lifetime energy cost ($p=.01$). In fact, lifetime energy costs are greater than purchase price. This is consistent and supportive of earlier findings and points out the need for such energy related information to be available to consumers in order for them to acquire an awareness of product cost in a more comprehensive fashion.

The possibility that consumers in the control condition did not perform as well on the above questions could also have been due to external factors such as not being able to calculate costs properly or an error in the estimation of the useful life of an average refrigerator-freezer. Table

10 indicates that there were no significant differences between conditions in terms of life estimates. In fact, both conditions are very close to the correct answer. Table 12 shows the results of a task each subject was asked to do--determine the most cost efficient product over its life. The lack of significance here indicates that both groups, when given the information and forced to determine costs, do a reasonably accurate job. It should be expected that the percentage accomplishing such a task accurately would improve over time due to increasing familiarity and experience. However, this does not mean that consumers will engage in such activity for comparison purposes. For example, focus group responses indicate consumers are not willing to engage in too much, if any, extra effort. Therefore, the presentation of information in a format which lays out the media cost data (i.e., LCC) may be preferable to a provision which makes such calculations necessary.

TABLE 12

Which Is More Cost Efficient--Top Flight or Exclusive?

Condition	Model Response[a]		Totals
	Top Flight	Exclusive	
LCC	21	4	25
Control	18	8	26
Totals	39	12	51

Chi-square = .94 with 1 degree of freedom
Significance level = .36

[a] The correct answer is Top Flight.

In general, the expectations of hypothesis 2a have been reinforced. The accuracy of consumers' perceptions of the relationships between cost dimensions and their importance is improved with the presentation of LCC information.

Hypothesis 2b. The purpose of this subhypothesis is to test the proposition that the presentation of LCC information will improve consumer recognition and recall of refrigerator-freezers' operating costs but reduce consumer ability to recall price. Among the factors of interest are:

(1) Consumer ability to see that various cost dimensions can be used to evaluate a product feature and to discriminate between alternatives (i.e., energy and service costs as well as price).

(2) Consumer knowledge of the cost information. If subjects "used" or spent time evaluating the cost information, they should be able to recognize the cost relationships better than those who do not receive the information.

(3) Comparing groups in terms of their ability to recall or recognize feature prices.

(4) Which features consumers spend more time with.

Table 13 shows the results of an open-ended question asking subjects to tell why they did or did not choose particular features. Reasons were broken down by cost considerations, other considerations, and responses indicating they did not care for the feature. Originally responses were coded into one of eight categories--price, energy, service, general cost, convenience, family, style, and

TABLE 13

Considerations in Evaluation of What Attributes to Include
(in percentages)

Feature	N			Cost			Other			Don't Care		
	LCC	Control	E/yr	LCC	Control	E/yr	LCC	Control	E/yr	LCC	Control	E/yr
Size	33	31	27	3.0	9.7	7.4	97.0	91.3	92.6	--	--	--
Side by Size	32	28	27	28.1	17.9	11.1	59.4	71.5	81.4	12.5	10.7	7.4
Top	29	26	21	27.5	15.3	19.1	68.9	80.8	71.5	3.4	3.8	9.5
Frost Free	32	31	28	6.2	3.2	7.1	93.8	96.8	92.9	--	--	--
Automatic Ice Maker	32	31	27	41.9	13.7	25.9	51.6	68.9	74.1	6.5	17.2	--
Ice and Water Dispenser	30	28	25	49.9	28.6	28.0	40.0	42.9	48.0	10.0	28.6	24.0
Energy Package	29	28	25	96.5	100.0	96.0	--	--	--	3.4	--	4.0
Service Contract	28	26	24	67.8	80.8	66.7	3.6	--	--	28.6	19.2	33.3

don't care about it. However, the large number of empty cells and small cell sizes made it necessary to collapse the scales. Very few people in any condition responded specifically by naming price, energy, or service. In fact the largest number of subjects in any one group responding in this manner was three, and the largest difference between groups was two subjects. The majority of subjects responded in a general cost sense (e.g., "it cost too much," "cost was the main factor," etc.). Consequently, the first four categories were collapsed into "cost considerations." Convenience, family, and style were collapsed into "other," and the remaining responses were indications that the subject did not care about the feature. Even collapsing in this manner, analysis is restricted to a discussion of percentage figures because of the large number of cells with less than five subjects. Results are very consistent. In all cases except two (energy package, service contract), a greater percentage of consumers in the LCC condition found cost consideration to be an important element in the evaluation of features. Differences were greatest for convenience features such as the automatic ice maker (LCC=41.9% _v_ Control=13.7%) and ice and water dispenser (LCC=49.9% _v_ Control=28.6%). Lesser differences, but still impressive, occur in consumer evaluation of freezer location (side by side=28.1% _v_ 17.9%; Top=27.5% _v_ 15.3%).

Cost is not a factor in consideration of size. The major response in this category was family considerations. Approximately 64% in both groups cited this as the main consideration. The overwhelming factor in choosing the frost free feature, on the other hand, was convenience.

It should be noted that only in the two cost saving features does the control group indicate more concern with cost. However, this is not surprising. Specific information regarding how much these features saved was not expressed in this condition. Only the price and a verbal explanation that they would "save" the consumer money were given. The careful shopper could be expected to want more information than this once they have been made aware of the dimension.

Based on the distribution of the percentage figures, there is support for the premise that without presenting consumers with specific cost data they will not, and cannot be expected to, recognize the importance and magnitude of the costs surrounding product features. Consequently, they are less likely to use them as evaluative criteria.

For those consumers that had the opportunity to evaluate total cost information regarding product features, recall of those costs in later tasks was significantly better than those subjects who had to recognize feature/cost relationships based only on availability of price information. As pointed out earlier, it was felt that analysis based solely on correct versus incorrect responses would not capture the full flavor of the informational impact. Consequently, the mean absolute deviation (MAD) for each subject's response was calculated. This statistic basically involves taking the absolute difference between the subject's response and the correct answer. These figures are then summed across respondents in the condition and divided by the total number of subjects. Comparisons between LCC and control means can then be made using a t statistic.

The results in Table 14 indicate that the presentation of total cost information gave the subjects a better basis for judging feature cost than just the availability of price. Subjects' knowledge of energy costs as well as total feature cost was significantly ($p<.005$) better in the LCC condition. Their deviations from the correct answer were significantly better than the control's. The results take on added importance when the order of the study is considered. That is, the recall and recognition task took place in the latter part of the experiment so that several other tasks occurred between the time subjects were exposed to the information and when they engaged in this task. These results support the expectation that consumers, when given the information, _will_ spend time evaluating that

TABLE 14

Cost Recall and Recognition Summing Over Features

Cost Dimension	Mean Absolute Deviation[a] LCC	Control	E/yr	t Prob[b]
Life Cycle Cost	1.69	2.57	1.82	<.005
Lifetime Energy	1.85	2.84	1.99	<.005
Price	1.69	1.45	1.61	<.1
Yearly Energy	1.70	2.61	1.59	<.005

[a] Mean Absolute Deviation (MAD) refers to the distance from the correct answer marked by the subject. The smaller the MAD, the greater the comprehension of the relationship between feature and cost dimension.

[b] This figure is the α-level probability for a t test between the LCC group and control.

information. That is, the presentation of such information will not be lost on the consumer.

It was expected that the increase in the amount of objective information would inhibit consumers' ability to recall price. This expectation was borne out to some extent (Table 14). The LCC condition which received four different dollar figures for each feature (i.e., price, lifetime energy, lifetime service, and total LCC) showed a significantly higher MAD ($p<.1$), compared to the control group which received only price information (1.69 v 1.45). It may be that those subjects in the LCC condition, having been exposed to a series of large numbers (i.e., lifetime costs), acquired an anchor for all subsequent costs which reflected their exposure to these relatively higher cost figures. Consequently, they tended to respond to feature prices with higher numbers than the other conditions. While this difference may decrease with increased exposure to the new information, it does raise the important question of whether the LCC concept does, in fact, provide too much information for the consumer to "handle" without producing negative effects in other areas.

In summary, the results support expectations presented in the subhypothesis. That is, the availability of LCC information does improve consumers' ability to recognize feature/cost relationships. This strengthens the proposition that consumers do "use" such information when it is available with positive results. Given that consumers had no prior knowledge of the objective information going into the task, results indicate they do learn from its availability. However, the increase in the amount of information did result in a decrease in consumer ability to recall feature prices.

Hypothesis 2c. It is proposed that the presentation of LCC information will increase consumer "liking" of energy saving features and decrease their liking for energy consuming features. Impact of the objective product information was measured on a five-point scale indicating the degree of "liking" of the feature by the consumer.

Table 15 shows the results of this task. A 5x2 contingency table for each feature was used for analysis using the chi-square statistic. The five columns represent the degree of liking responses ("Like a Great Deal: A Must To Have" to "Dislike The Feature"), and the two rows represent the LCC and control conditions. A strong result is shown for the automatic ice maker between conditions (p=.01). An examination of the proportions indicates the control group was more favorable toward this convenience feature than LCC. An examination of the other percentage relationships shows the same trend. That is, a greater percentage of consumers in the LCC condition tended to dislike energy consuming features more, and energy saving features less, than the control condition. However, the trends were not strong enough to reach significance. A more important result for this study when taken in relation to other findings is the nonsignificant differences for the energy package. Both groups evaluated the energy package highly. However, the results of the next task show a significant difference on choice of the energy package for inclusion in their model. That is, significantly fewer consumers in the control condition included the energy package in their model. This suggests that consumers will evaluate an energy saving feature highly, but a commitment to purchase does not necessarily

TABLE 15

Feature Evaluation
(percentages)

Variable	Dislike		Don't Care		Good		Very Good		Must to Have	
	LCC	CON	LCC	CON	LCC	CON	LCC	CON	LCC	CON
Automatic Ice Maker[a]	18.2	10.3	18.2	20.7	15.2	17.2	36.4	6.9	12.1	44.8
Energy Package	0.0	3.3	15.2	23.3	18.2	30.0	33.4	13.3	33.3	30.0
Frost Free	3.0	3.2	6.1	3.2	0.0	6.5	9.1	6.5	81.8	80.6
Ice and Water Dispenser	27.3	13.3	30.3	43.3	12.1	16.7	24.2	20.0	6.1	6.7
Service Contract	18.2	16.7	42.4	33.3	18.2	23.3	18.2	16.7	3.0	10.0
Side by Side Doors	30.3	32.3	30.3	16.1	3.0	16.1	18.2	19.4	18.2	16.1
16 Cubic Feet	35.7	30.0	3.6	23.3	32.1	26.7	17.9	6.7	10.7	13.3
19 Cubic Feet	3.2	20.7	16.1	6.9	22.6	24.1	35.5	34.5	22.6	13.8
22 Cubic Feet	17.2	37.9	31.0	24.1	27.6	10.3	17.2	13.8	6.9	13.8

[a] Chi Square Value = 12.7, 4 d.f., p=.01

follow. This supports once again the contention that LCC information has an impact on consumer evaluation and convictions.

Hypothesis 2d. This subhypothesis says that the presentation of LCC information will increase the proportion of consumers choosing energy saving features and decrease the choice of energy consuming convenience features. The task subjects are asked to do involves "building" their own refrigerator-freezer. This task is intended to come close to approximating behavioral tendencies. Table 16 shows the results of the building task. Again, data was analyzed using the chi-square statistic because of the dichotomous nature of the responses (i.e., choose *v* not choose).

The only significant result of the building task shows a difference between conditions on the inclusion of the energy package ($p=.02$). Although both groups were aware that the energy package was designed to save energy, the LCC group included it significantly more than the control. This strengthens the result concerning the availability of cost information. It is consistent with past results and even the focus group interviews in concluding that consumers are not willing to trade energy savings for price increases unless savings can be shown. That is, consumers are not willing to sacrifice price for vague assurances that a feature will reduce energy costs.

TABLE 16

Building Task

Feature	% Making the Energy Efficient Choice[a]		X^2 Value	D.F.	Level of Significance
	LCC	Control			
Freezer Location	69.7	54.8	0.94	1	n.s.
Frost Free	6.1	3.2	0.003	1	n.s.
Automatic Ice Maker	51.5	38.7	0.60	1	n.s.
Ice and Water Dispenser	72.7	67.7	0.03	1	n.s.
Energy Package	90.9	64.5	5.06	1	.02

[a] The energy efficient choice is the alternative that uses the least energy.

While no other results reached significance, in all cases the percentage responses were in the right direction. And, in the case of the automatic ice maker, over 50% of the LCC group chose to do without it (51.5%) while less than 50% of the control chose to do so (38.7%).

Summarizing the results for these tasks, the conclusions drawn from each subsection indicate some support for the main hypothesis. However, as consumers were subjected to tasks aimed at measuring more behavioral types of responses, such as the building task, results became weaker. This is not an unexpected finding and, in fact, would be cause for concern regarding the validity of the study if results were in the opposite direction or even consistently strong throughout. That is, given new information in a more comprehensive and unique framework and having been exposed to it only once, it should be expected that the effects of the information would not have as strong an impact at the latter stages of the hierarchy of effects.

Hypothesis 3

Helpfulness, complexity, and certainty are three dimensions that relate to information. What the impact of new information on the consumer in these areas will be, and even should be in the latter two cases, is not clear. It is expected that the presentation of LCC information will lead to consumers being more certain about their choices and to view the cost information as more complex and more helpful. However, several interpretations of results like this are possible, so the main purpose in this study is to describe the impact and offer some preliminary explanation.

Because of the more comprehensive presentation of cost information in the LCC condition, consumers should be better able to discriminate between models of refrigerator-freezers. And if the information is utilized, it should be perceived as more helpful as well as more complex than information presented to the control group. Table 17 shows the results of two questions asking subjects to indicate how helpful and complex the information was. Both "helpfulness" and "complexity" scales are seven-point bipolar adjective scales and can be treated as interval data. Consequently, individual t tests can be run comparing group means. The "helpfulness" dimension is the most clear-cut of the three, and the LCC information was judged more helpful than price (p=.08). However, it was also expected that because of the newness of LCC information, as well as the interactive dimensions, LCC data would also be viewed as more complex. It can be seen from the mean values that LCC was judged somewhat more complex (-1.14 compared to -1.6), but the difference was not significant and both groups indicated the information was "simple" as opposed to "complex." This may reflect (1) LCC information is not too complex to be comprehended and used and/or (2) LCC information was not evaluated in its most comprehensive framework. That is, some dimensions and interactions may have been missed or ignored by subjects.

TABLE 17

Consumer Evaluation of Cost Information

	N			Mean Values				
Dimension	LCC	Control	E/yr	LCC	Control	E/yr	F Prob[c]	t Prob[d]
Helpfulness	29	27	26	2.31[a]	1.78	1.62	.06	.08
Complexity	29	27	26	-1.14[b]	-1.60	-1.81	.11	-

[a] Positive numbers indicate that the information was helpful. Subject response was on a seven-point -3 to +3 scale.

[b] Negative numbers indicate the information was judged "Simple." Subject response was on a seven-point -3 to +3 scale.

[c] This figure is the α-level probability for one-way ANOVA on each variable using the three groups as levels for the single factor.

[d] This figure is the α-level probability for a t test between the LCC group and control.

Because of the availability of the more comprehensive cost information, it was also expected that consumers would feel more certain about their choices of refrigerator-freezers in terms of their conviction that their choice was a wise one. In response to a question asking subjects how sure they were they made the best judgment regarding models of refrigerator-freezers, there were no significant differences between LCC and control (t=.052, 79 d.f., p=.96). The mean value for both LCC and control on the -3 to +3 scales was 1.7. A number of explanations can be given for both groups indicating reasonable certainty that they made the best judgment possible. Subjects may have felt that given the information they were, they in fact, did make the best judgment possible. This is a logical explanation when one thinks of the current information environment. That is, consumers usually receive only price information, and consequently their experience and expectations revolve around this type of atmosphere. Consequently, for the control condition, the absence of other cost information is irrelevant to the decision and probably not even associated with the product.

In general, the conclusions drawn from investigating this hypothesis support the presentation of LCC information being made available to consumers. Consumers do appear to utilize the energy information and associated relationships, if not in all of its complexity at this time, and do find it helpful in judging features. The fact that it was not judged more complex may be interpreted in two ways, and it is not possible to tell in this study which one, if either, reflects the true consumer state. The results may indicate that the cost information can be successfully evaluated without too much trouble. However, one might also expect that if the information was utilized successfully, it would lead to higher complexity ratings because of the recognition of the interactions between components, and this was not the case.

Hypothesis 4

Because of the increased cost information and the relationship between components, it is expected that consumer response to LCC information will be affected by educational level. The relationship between energy and cost was analyzed in a two-way ANOVA with three levels of education (high school or less, some college, college or more) and three levels of cost (LCC, energy/year, control). Two-way ANOVA was chosen because of an expected interaction effect between education and the cost information, and this procedure allows for the evaluation of combined effects of two or more treatments. In general, it is hypothesized that the LCC group will be more responsive to energy and service cost efficiencies _and_ that as educational level increases this response will be more pronounced than in the control condition. The same kind of relationship is expected to hold for the control group but at a lower level and the effect as education increases will be less. In all tests variables were either interval or ratio scaled.

Hypothesis 4a. While there is no reason to expect that educational level will affect consumer perceptions of price, it is expected that the accuracy of consumer perceptions of what it costs to operate an average refrigerator-freezer will increase as education increases. Table 18 shows that there are no significant differences between groups or educational levels in terms of consumer perceptions of what it costs to own (i.e., price) an average refrigerator-freezer. Comparing this result with earlier findings, the decrease in consumer ability to recall price does appear to be a function of the information and not educational level.

However, significant differences do occur for perceptions of operating costs (Table 19). Supporting previous findings, there is a significant difference between LCC and Control in terms of perceptions of operating costs (see Table 10). But, _educational level is not a factor, either as a main effect or interactive effect_. This is especially

Table 18

Two-Way ANOVA: Perceptions of Purchase Price

Source of Variation	F	Level of Significance	Mean Values[c]			
			Cost		Education	
Main Effects			LCC	$718	HS<	$ 616
Cost (C)[a]	0.85	.99	E/YR	$578	SC	$ 710
Education (E)[b]	1.61	.21	CON	$577	COL	$ 571
CxE Interaction	0.47	.99				

[a] LCC=life cycle cost information group, E/YR=energy/year information group, CON=control group.

[b] HS<=high school or less education, SC=one to three years of college, COL=four years of college.

[c] Dollar figures are responses to an open-ended question

TABLE 19

Two-Way ANOVA: Perceptions of Operating Cost

Source of Variation	F	Level of Significance	Mean Values[c]			
			Cost		Education	
Main Effects			LCC	$1158	HS<	$1167
Cost (C)[a]	4.35	.02	E/YR	$ 985	SC	$ 742
Education (E)[b]	1.00	.99	CON	$ 510	COL	$ 417
CxE Interaction	1.01	.41				

[a] LCC=life cycle cost information group, E/YR=energy/year information group, CON=control group.

[b] HS<=high school or less education, SC=one to three years of college, COL=four years of college.

[c] Dollar figures are responses to an open-ended question

important for the LCC group. It may be an indication that the information is not too complex to be handled by people with less education. In fact, there was no difference in low education subjects' performance, and as a group LCC awareness of the operating costs were significantly better than the control's.

Hypothesis 4b. As educational level increases, consumer perceptions of the complexity of cost information as well as its potential helpfulness in decision making will increase. Following the building task, subjects were asked to indicate how helpful the cost information was by responding to a seven-point (-3 to +3) scale ranging from "Very Unhelpful" to "Very Helpful." The results can be seen in Table 20.

TABLE 20

Two-Way ANOVA: Helpfulness of Cost Information

Source of Variation	F	Level of Significance	Mean Values[c]			
			Cost		Education	
Main Effects			LCC	2.31	HS<	1.94
Cost (C)[a]	4.15	.02	E/YR	1.62	SC	1.96
Education (E)[b]	0.21	.99	CON	1.78	COL	1.86
CxE Interaction	1.34	.27				

[a] LCC=life cycle cost information group, E/YR=energy/year information group, CON=control group.

[b] HS<=high school or less education, SC=one to three years of college, COL=four years of college.

[c] Responses were on a seven-point -3 to +3 scale where -3="very unhelpful" and +3="very helpful."

As seen in earlier analysis also, a strong main effect is present for the cost levels (p=.02). However, there is no main effect of education nor is there an interaction effect between education and cost. Regardless of education, consumers tended to regard the information as helpful. However, those subjects receiving LCC information found that information to be significantly more helpful than information provided the control group. In general, this is a positive result for the presentation of more comprehensive cost information.

It was also expected that subjects with higher levels of education would view the LCC information as more multidimensional and therefore more complex since it was more likely they dealt with the information in greater depth and would be better able to see the interactions between components. Table 21 shows no main effect for either cost or education and no interaction effect. However, looking at the percentages of subjects judging the information to be simply yields some support for the subhypothesis in terms of direction. In both cost conditions (LCC, control), a greater percentage of consumers with a high school or less education compared to a college education judged the information to be simple (Table 22). The relationship holds between low education and some college also, except in the control group. One possible explanation for this consistent occurrence is that consumers with less education failed to use the information or evaluated it only on a superficial level. Higher educated subjects spent more time with the cost information and it was consequently judged somewhat more complex. The inconsistency in the control group may reflect the fact that

TABLE 21

Two-Way ANOVA: Complexity of Cost Information

Source of Variation	F	Level of Significance	Mean Values[c]			
			Cost		Education	
Main Effects			LCC	-1.14	HS<	-1.61
Cost (C)[a]	2.33	.12	E/YR	-1.81	SC	-1.43
Education (E)[b]	0.40	.99	CON	-1.60	COL	-1.50
CxE Interaction	0.75	.99				

[a] LCC=life cycle cost information group, E/YR=energy/year information group, CON=control group.

[b] HS<=high school or less education, SC=one to three years of college, COL=four years of college.

[c] Responses were on a seven-point -3 to +3 scale where -3="very simple" and +3="very complex."

TABLE 22

Percentages of Consumers Judging Cost Information "Simple"

Cost Condition	Education Level		
	High School or Less	Some College	College
LCC	100.0	55.6	53.8
Control	71.4	80.0	70.0

the medium education group is better equipped to deal with objective information than low education, but does not read the subtleties of price data such as relationships to cost of capital and time value of money as well as higher educated subjects.

In order to explore in greater depth the issue of consumer ability to handle the new and more comprehensive LCC information, it was decided to analyze subjects' mean absolute deviation scores (page 35) in conjunction with educational level. The design is essentially a three factor design with repeated measures on one factor and multiple dependent measures. One factor is "Information" with LCC, energy/year, and control levels. The second factor is "Education" with high school or less, some college, and college completed levels. The third factor is "Features," and each subject provides a cost estimate for each of five features (i.e., the repeated measures or "occasions" facts). The multiple dependent measures occur since each subject provides four (life cycle cost, energy/year, price, lifetime energy cost) cost estimates for each of the five features. Such a design is basically a combination of the factorial and treatments-by-subjects design (Bruning and Kintz, 1968).

The appropriate analysis procedure for this type of design is multivariate analysis of variance (MANOVA). A convential ANOVA applied to designs in which each subject is measured repeatedly requires stringent assumptions concerning homogeneity of covariances (i.e., correlations). Violation of these assumptions results in artificially high F values and too many rejections of the null hypothesis for the stated significance level (McCall and Appelbaum, 1973). MANOVA can be applied to such designs and makes no assumptions regarding covariances.

However, in setting up the design it was discovered that cell sizes were not adequate to permit accurate analysis. Subjects in low education cells did not give enough answers to the feature cost task. There were not enough people in each education/information group responding to the four costs for each feature to permit meaningful analysis using MANOVA. Consequently, mean absolute deviations (MAD's) were analyzed using ANOVA procedures. As a result, figures should be interpreted with caution due to the increased probability of significant findings resulting from chance. Nevertheless, it is felt that the information is useful, especially the direction of mean values.

If education were to have an effect on the ability of consumers to "handle" the cost information, one would expect that higher MAD's would be seen in the high school or less category. Results are summarized in Table 23. Collapsing across the three information conditions, 9 of the 20 (5 features by 4 costs) cases showed significant differences. The low education group performed significantly worse than either group which had some college education ($p<.005$ in all cases) in seven of the cases. These results, coupled with the fact there were no significant differences between groups on prices, indicate that lower educated subjects do have some trouble in recalling or recognizing the specific operating cost relationships.

TABLE 23

One-Way ANOVA--Effect of Education on MAD's

Feature Costs	MAD's			F	Level of Significance
	HS<[a]	SC[a]	COL[a]		
LCC					
Automatic Ice Maker (AIM)	1.12	1.44	1.29	0.35	n.s.
Frost Free (FF)	4.36	3.27	3.06	4.17	<.05
Ice and Water Dispenser (IAW)	1.39	1.38	1.60	0.30	n.s.
Side by Side Doors (SSD)	2.00	2.62	3.00	3.72	<.05
Energy Package (EPK)	2.57	0.76	0.35	13.40	<.01
Lifetime Energy					
AIM	2.58	1.54	1.42	4.14	<.05
FF	4.69	2.75	1.91	9.23	<.01
IAW	2.17	1.92	2.73	1.98	n.s.
SSD	2.57	3.50	3.06	1.63	n.s.
EPK	3.19	0.52	0.49	12.42	<.01
Price					
AIM	2.00	1.54	1.37	0.85	n.s.
FF	1.53	1.46	1.57	0.03	n.s.
IAW	1.29	1.48	1.47	0.14	n.s.
SSD	1.86	1.64	2.31	1.46	n.s.
EPK	1.94	1.30	1.31	1.36	n.s.
Yearly Energy Cost					
AIM	1.75	1.44	1.57	0.26	n.s.
FF	2.67	2.30	1.63	2.57	<.1
IAW	3.00	2.35	2.55	0.57	n.s.
SSD	1.27	2.54	2.49	6.45	<.01
EPK	3.13	0.85	0.86	7.15	<.01

[a] The three levels of education are high school or less (HS<), some college (SC), and college educated (COL).

Several other interesting facts can be seen in the table. Of the seven significant cases in which the low education group had higher MAD's, three involved the frost free feature and three involved the energy package. Problems with handling information on the energy package may have resulted from the presentation of the cost data. That is, cost figures involved money saved rather than paid out. This represents a new approach and may well have been more difficult to deal with for low education subjects. With regards to the frost free feature, lower educated subjects may have been less inclined to make the effort to evaluate the cost information on a feature they felt was "necessary" at almost any cost.

The other interesting finding concerns the two situations where the low education group had significantly smaller MAD's than higher educated subjects. Both cases involve side by side doors. The reason for this may be subjects' involvement in the choosing of the feature. In this case, 50% of the subjects in the low education group chose to include this feature in their model, while 42.9% of the middle educated subjects and only 32.5% of the high education subjects included the feature.

Table 23 deals with the aggregate effects of education. In Table 24, we are able to better judge the relationship between education and the presentation of the cost information. Here, MAD's were compared by education within condition (see Table 24). Because of the large number of comparisons possible, resulting in the analysis problems discussed earlier, only mean values and direction of responses are presented.

It can be seen from an examination of the mean values that MAD's were lowered in 17 of the 20 cases for the low educated subjects, 12 of 20 cases for middle educated subjects, and 14 of 20 cases for high educated subjects with the availability of LCC information. That is, if the control group responses represent the present knowledge of consumers going into the task, and LCC responses what they learn, it appears that consumers do, in fact, benefit from the LCC information to some degree.

In examining responses by educational level, mean responses indicate that low education subjects do benefit from the LCC information. In fact, it appears that their improvement in MAD scores is greater than for either of the other two groups. Of course, this is partially a function of the fact their original MAD's (i.e., control group responses) were much larger in many cases than college educated subjects'. Nevertheless, the information is not lost on the subjects, and they do show a reduction in MAD's with the presentation of LCC information. The average overall

TABLE 24

Feature Costs and Mean Absolute Deviations

Costs and Educational Levels[b]	Features and Information Conditions[a]														
	AIM			FF			IAW			SSD			EPK		
	LCC	E/YR	CON	LCC	E/YR	CON	LCC	E/YR	CON	LCC	E/YR	CON	LCC	E/YR	CON
Life Cycle Cost															
HS<	0.86	1.75	1.00	3.57	4.00	5.30	1.20	1.50	1.50	0.88	2.83	2.67	2.33	1.67	3.50
SC	1.13	2.25	1.00	3.13	1.75	4.60	1.43	1.00	1.67	2.00	2.75	3.00	0.57	0.63	1.00
COL	1.00	1.55	1.40	2.92	2.18	4.20	1.00	1.64	2.30	2.75	2.90	3.40	0.31	0.00	0.80
Life Time Energy															
HS<	1.40	3.33	3.50	3.00	5.20	6.20	1.60	1.67	3.25	2.00	3.50	2.50	1.60	1.40	6.00
SC	1.25	1.44	2.00	2.75	2.00	3.71	1.88	2.11	1.71	3.00	3.11	4.57	1.13	0.11	0.33
COL	1.55	1.08	1.70	1.42	1.42	3.10	2.91	2.67	2.60	2.67	3.25	3.30	0.23	0.58	0.70
Price															
HS<	1.83	2.00	2.14	1.60	2.33	1.14	1.60	1.00	1.14	1.17	2.33	2.87	0.80	2.75	2.29
SC	2.33	1.68	0.70	1.89	0.89	1.60	0.75	1.22	1.50	1.11	1.89	1.90	1.88	1.11	1.00
COL	1.39	1.46	1.22	1.92	1.46	1.20	1.50	1.62	1.22	2.08	2.69	2.11	1.85	1.08	0.90
Yearly Energy															
HS<	1.00	1.50	2.60	1.89	2.00	3.70	1.60	3.00	4.75	1.56	1.20	1.00	2.00	2.00	4.84
SC	1.75	1.11	1.50	1.56	2.00	3.33	2.38	2.11	2.56	2.11	2.11	3.30	1.11	0.11	1.33
COL	1.69	1.50	1.50	1.46	1.00	2.60	2.62	2.33	2.75	1.92	3.08	2.44	0.77	0.08	1.90

[a] AIM=automatic ice maker, FF=frost free, IAW=ice and water dispenser, SSD=side by side doors, EPK=energy package, LCC=life cycle cost group, E/YR=energy/year group, CON=control group.

[b] HS<=high school or less education subjects, SC=subjects with one to three years of college, COL=subjects with a college degree.

improvement for the high school or less group was 1.42 MAD's, while improvement for the middle educated group was .27 MAD's and .36 MAD's for the high education group. This average figure was calculated by taking the difference between control and LCC responses on each feature/cost combination, summing the figures for each education condition and dividing by twenty.

Overall, however, it appears that lower educated consumers do have some trouble in recalling or recognizing feature/cost relationships. In the control condition, low education subjects had higher MAD's in 13 of 20 cases, including all four cases involving the energy package. Of the seven cases where low education subjects did better, three involved side by side doors which is consistent with the overall results of Table 23, two involved price, and two involved convenience features (i.e., automatic ice maker, ice and water dispenser). This may be the result of lower educated consumers having to be more current dollar conscious because of lower paying jobs usually associated with people having a high school or less education.

Also in 6 of the 13 cases where low education subjects had higher MAD's, MAD's continued to be the highest after the introduction of LCC although mean values were lower in each case. In the other seven cases MAD's for lower educated subjects were below at least one of the other group's MAD after the introduction of LCC information. Three of these cases involved price and two each for lifetime energy cost and yearly energy cost on convenience features (i.e., automatic ice maker, ice and water dispenser). It may be that price takes on even more importance to lower educated subjects when the other cost figures are present. Also, the availability of energy costs for convenience features may have been an important factor in deciding on the inclusion of two features which are not necessities.

In summary, the results concerning this subhypothesis are equivocal at this stage. While education does not appear to be a factor in the perceptions of overall operating costs, lower educated subjects do have problems in recognizing and recalling specific feature/cost relationships. However, the introduction of LCC information does produce somewhat lower MAD's. That is, the information does appear to be learned to some degree.

Hypothesis 4c. As educational level increases, consumer satisfaction with models containing energy saving features and relative dissatisfaction with energy consuming models are expected to increase. It was expected that the higher educated subjects across groups will find the cost information easier to deal with. Therefore, they will be more likely to conclude that models exhibiting energy saving features are a wise choice since they will recognize the cost advantages of models with these features easier than will lower educated subjects.

This design is very similar to that used to test Hypothesis 1a. However, in addition to the "Information" and "Models" factors, there will also be an "Education" factor with three levels--high school or less, some college, and college completed. Consequently, this is a three factor design with repeated measures on one factor (i.e., Models). As such, the correct analysis procedure is multivariate analysis of variance (MANOVA). Mean values by educational level for the models can be seen in Table 25, and a graph of the values in Figure 5. Main effects and interaction effects of Models and Information have already been discussed in conjunction with Hypothesis 1 (Table 6). Consequently, Table 26 presents the results involving the Education factor only.

TABLE 25

Model Satisfaction Mean Values by Educational Level

Education[a]	M1	M2	M3	M4	M5	M6
HS<	-0.66	0.38	0.07	0.83	1.54	2.14
SC	-2.08	-0.78	-1.09	-0.21	1.02	2.20
COL	-1.74	-0.15	-0.79	0.19	0.93	1.51

[a] HS<=high school or less education, SC=one to three years of college, COL=completed college.

[b] Satisfaction was measured on a -3 to +3 scale with -3="very unsatisfactory" and +3="very satisfactory."

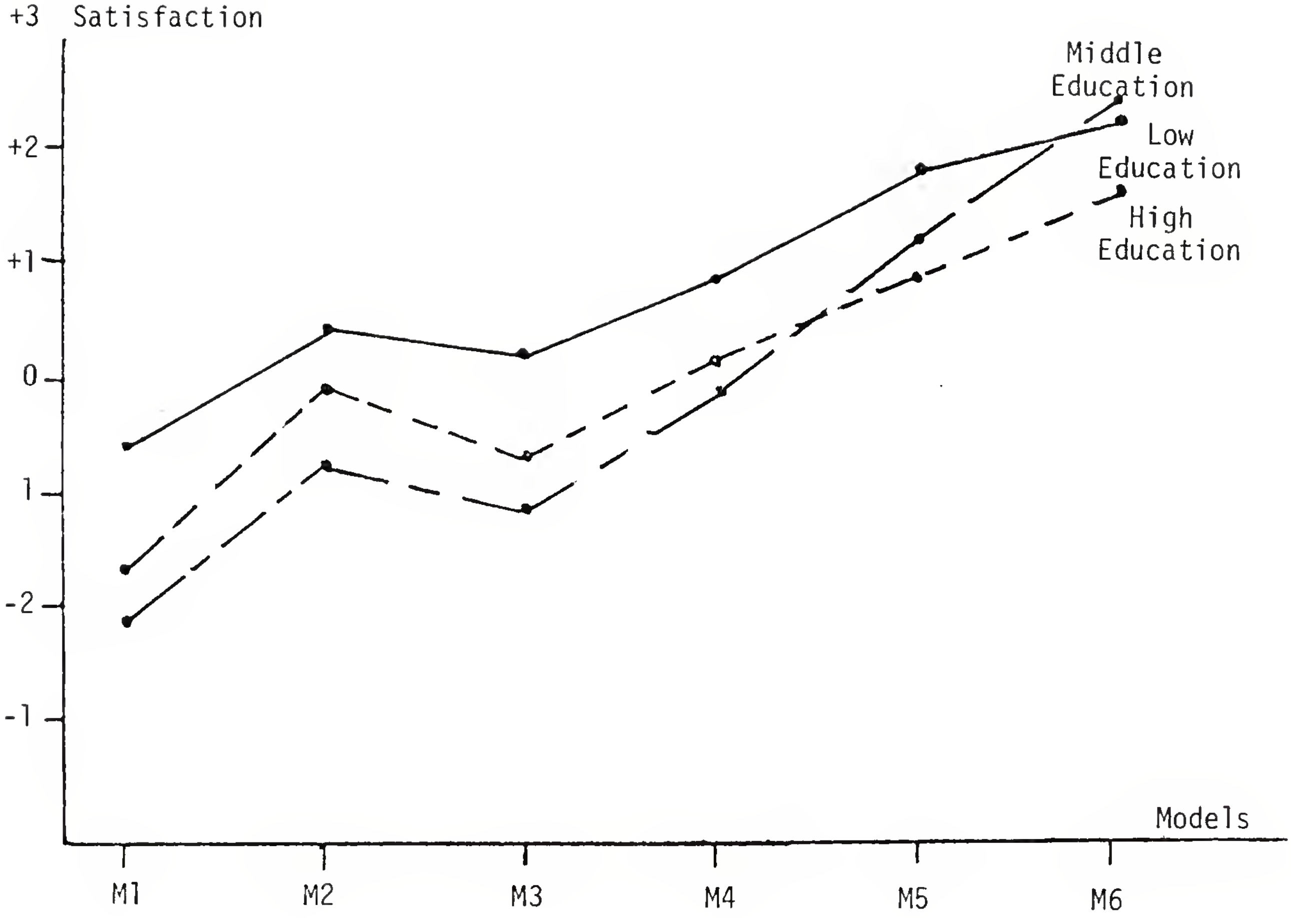


FIGURE 5

Mean Values for Model Satisfaction

TABLE 26

MANOVA: Model Satisfaction

Source	d.f.	F Value	F Prob.
Education (E)	2,81	7.00	.002
Education x Information (ExI)	4,81	2.03	n.s.
Education x Models (ExM)	10,154	0.68	n.s
ExMxI	20,266	1.02	n.s.

An examination of Table 26 shows no significant interactions between the Education factor and the other two. However, there is a main effect for education. That is, collapsing across conditions, educational level does affect satisfaction ratings. An examination of the mean values in Table 25 and Figure 5 show that low education subjects tend to be more satisfied with the models, and consumers with more than a high school education tend to be more negative in their ratings. Higher educated subjects are more critical in their evaluations. This may be a function of the amount of time and effort spent in evaluating the models. An inconsistency does exist in the ratings between middle and high education groups. In four of the six cases, the high education subjects rated the models somewhat more favorably than middle education subjects. This may be a result of the breakdown for educational levels (i.e., the middle education group had one to three years of college and high education subjects have completed four years of college). If the two college educated groups were collapsed to one, the college educated subjects would be less satisfied with all models.

Summarizing the results bearing on Hypothesis 4, several conclusions should be emphasized. First, regardless of education level, consumers view cost information as helpful. Second, although results are equivocal at this stage, low education subjects do not appear to use the increased cost information quite as well as higher educated subjects. But, the availability of LCC information is not ignored by low education subjects. At least some of it is learned. Taking the results in total, it does not appear that educational level is a crucial factor in terms of the impact objective information has on consumers.

Hypothesis 5

This hypothesis states that consumer response to cost information will vary with household earnings, number of children, age, and education. In order to study the specific relationships, the hypothesis can be broken down into two subhypotheses.

Hypothesis 5a. As age, income, education, and the number of children living at home increases, it is expected that consumer evaluation of the magnitude of energy costs relative to price will increase. In order to test for interactions between these demographic variables, correlations were calculated using Pearson's r (Table 27). Results indicate that there are several significant relationships among the variables. Consequently, it was necessary to use an analysis procedure which controlled for the influence of three variables while assessing the relationship between the third variable and selected dependent measures. A technique which can be used to obtain a measure of the strength of the relationship between two variables when the joint effects of the other variables have been removed is partial correlation analysis. Dependent measures that relate to consumers' evaluations of energy and price include their perceptions of purchase price and operating costs of an average refrigerator-freezer and the relative magnitude of price and electricity. The results of the analysis are presented in Table 28.

TABLE 27

Correlation Analysis on Demographics

	Age	Education	Income	Children
Age	1.00			
Education	-0.37[a]	1.00		
Income	0.03	0.21[b]	1.00	
Children	0.10	-0.27[c]	0.25[b]	1.00

[a] $p = .001$
[b] $p < .05$
[c] $p < .01$

TABLE 28

Partial Correlation Analysis on Selected Demographics[a]

Variable	Age	Education	Income	Children
Perceptions of price	.22[c]	.01	.07	-.09
Perceptions of operating costs	.04	.11	-.12	.33[d]
Relative costs--electricity x price[b]	-.01	-.05	.14	.12

[a] Results represent the correlation of the demographic variable with the dependent measure controlling for the effects of the other demographic variables.

[b] The dependent measure in this case is dichotomous. Consequently, a point-biserial correlation is the correct procedure. Guilford (1956) notes that computer programs giving Pearson r's from score data automatically yield point-biserial r's between continuous and dichotomized variables. Consequently, this row is composed of point-biserial r's.

[c] $p<.05$

[d] $p<.01$

It does not appear that age accounts for any differences in consumers' perceptions of the relative magnitude of price and energy costs ($r=-.01$) or in their evaluation of general operating costs ($r=.04$). Neither income nor education appears to affect consumer perceptions of product cost. Only two correlations do reach significance. As age increases, consumers' perceptions of the price of an average model also increases ($r=.22$, $p<.05$). It may be that the price of products such as refrigerator-freezers are seen as higher by older consumers because of their experiences in seeing prices increase significantly over the years or the possibility they are on fixed incomes. Either of these factors could inflate their perceptions of the price of products in today's economy. The second significant relationship indicates that as the number of children living at home increase, consumer perceptions of operating costs also increases ($r=.33$, $p<.01$). This was expected since consumers with more children tend to have larger units, and they are used more. For example, the doors to the unit will be open and shut more in a large family, and this will tend to increase energy costs.

In general, the expectations of this subhypothesis were not supported. Age does not affect consumer perceptions of energy costs, although it does appear to influence perceptions of price. No significant correlations were found between perceptions and education or income. Finally, only operating cost perceptions were significantly correlated with the number of children living at home.

Hypothesis 5b. As consumers' earnings and number of children increase, it is expected that their evaluation of models and features which increase convenience and reduce work time will also increase while increases in age and education will show increased favorability toward energy saving models and features. Results of the partial correlation analysis can be seen in Table 29.

As can be seen from the table, the number of children consumers have living at home does not affect their evaluations of models or features. However, the relationship

TABLE 29

Partial Correlation Analyses on Consumer Evaluations[a]

Variable	Age	Education	Income	Children
Satisfaction with Model 3[b]	.17	.02	-.41[e]	-.11
Satisfaction with Model 4[b]	-.05	-.20[d]	.19	-.19
Evaluation of automatic ice maker[c]	-.13	-.23[d]	.39[e]	-.15
Evaluation of energy package[c]	.21[d]	.20[d]	-.26[f]	.09
Evaluation of frost free[c]	-.17	-.17	.31[g]	.09
Evaluation of ice and water dispenser[c]	.14	-.11	.21[d]	-.12
Evaluation of side by side doors[c]	.24[d]	.22[d]	-.10	.01

[a] Results represent the correlation of the demographic variable with the dependent measure controlling for the effects of the other demographic variables.

[b] The satisfaction scale was a -3 to +3 scale with endpoints labeled "very satisfactory" and "very unsatisfactory."

[c] The evaluation scale was a five-point scale with endpoints labeled "dislike the feature" and "like a great deal--a must to have."

[d] $p<.05$

[e] $p=.001$

[f] $p=.01$

[g] $p<.01$

between income and the dependent measures is in the right direction and significant. The inverse relationship between consumer satisfaction with Model 3 and income was expected since Model 3 does not possess any convenience features ($r=-.41$, $p=.001$). In the cases of three convenience features, significant positive correlations are found indicating that as income increases consumers have a more favorable attitude toward convenience features (automatic ice maker, r=.39, p=.001; frost free, r=.31, p<.01; ice and water dispenser, r=.21, p<.05). Also, as income increases evaluation of the energy package was less favorable (r=.26, p=.01). It may be that the energy package was not judged a must to have since higher income consumers felt they could afford to pay the electric bill and could spend their money better elsewhere.

As expected, a significant positive correlation occurs between age and the evaluation of the energy package (r=.21, p<.05). As age increases consumers have increasing financial concerns, especially with inflationary problems and expectations of fixed incomes in the future. Consequently, they would tend to look on cost reducing features very favorably especially for the long run. The positive correlation between age and side by side doors (r=.24, p<.05) was somewhat unexpected since they use somewhat more energy than a top freezer. It may be that the convenience of this arrangement outweighs the added cost since consumers would not have to stoop as much or engage in high lifting.

Educational level also produced expected results. The significant inverse correlation between education and Model 4 (r=.20, p<.05) indicates that higher educated people evaluate models which are not energy efficient (Model 4 has both convenience feature but no energy package) as being less satisfactory. This is further supported when one looks at the individual features. A significant inverse correlation exists between education and automatic ice maker ($r=-.23$, $p<.05$), and the correlations are in the expected direction for frost free and ice and water dispenser although they did not reach statistical significance. A significant positive correlation does exist for the energy package ($r=.20$, $p<.05$) indicating higher educated subjects are more favorable toward energy conserving features. Again, an inconsistency exists regarding the side by side doors ($r=.22$, $p<.05$). It appears that convenience once again outweighs the increase in cost.

The expectations of this subhypothesis were supported in part. While the number of children living at home does not appear to affect evaluations of models and features, age, education and income do. Increased earnings produce greater favorability for convenience features while increasing age and education show a positive correlation with energy saving models and features and less favorability toward convenience features.

Discussion of Results

The results of the preceding hypotheses' tests have provided a number of interesting conclusions. In general, the strongest results are seen in hypotheses reflecting levels of consumer response in a more cognitive, as opposed to behavioral, sense. However, this is not an unexpected finding. The information presented by LCC is basically "new" to consumers. Of course, it may be "new" in one or a number of ways. Consumers may not have thought about it applying to the product in question before. It may be new in relation to the other costs involved or in terms of the framework in which it is presented. In any case, given this "new" information in a more comprehensive and unique framework and exposing it to the subjects only once, it should be expected that the effects of the information would not have as strong an impact on measures attempting to approximate behavioral tendencies. In order to analyze the effects of LCC information on a consumer's processing of new product information further, this conclusion will summarize the results of the above analysis by various levels of consumer response.

Analyzing open-ended questions concerning what other information consumers would like to have had while building their own refrigerator-freezers produced no differences between LCC and control. This result was significant because subjects were asked to consider both family needs and budget. Control group subjects received only price, and if consumers actively consider energy and service factors as product costs, differences should result. The explanation as to why the control group did not request other cost information is likely due to one of two reasons: (1) subjects failed to make any association between product features and energy consumption or (2) subjects recognized the association but did not consider such factors as significant contributions to product cost. A second open-ended question asking subjects to list those factors involved in the operation of a refrigerator-freezer supports the latter reason. There were no differences between conditions in mentioning energy and service costs as contributing factors, and both groups did tend to list such factors. The conclusion is that while subjects are currently aware of the fact that the products and features do use energy, they do not consider such costs as important either in an absolute cost sense or as a discriminating attribute. This general predisposition may be a function of consumers feeling they have no control over the cost or that the costs are not large enough to warrant consideration.

Awareness implies having knowledge or being cognizant of something through information. A closely related concept is that of accuracy. Whether or not consumers can apply their knowledge in an accurate manner is an extension of the concept of awareness. Subjects were asked a series of open-ended questions about the costs of owning and operating refrigerator-freezers. Although there is no "correct" answer to these questions, the perceived relationships between the cost figures and the absolute amounts given show some interesting differences. In a key finding of this study, those subjects who had the opportunity to become exposed to LCC information did significantly better in recognizing the price/operating cost interaction. A weak difference occurred in perceptions of price with the LCC group quoting higher prices. In terms of operating costs the LCC group was significantly more accurate in perceiving the relationship between price and operating costs. That is, given the figure quoted for price of an average model, they were much more accurate in the determination of operating costs. The control group underestimated the impact of the operating costs. In fact, they said that operating costs would be lower than price over the life of the product, whereas the LCC group determined the opposite, and correct relationship. In addition, the control group chose price as being higher than energy cost over the life of the product when, in fact, this is generally not the case. The LCC group chose energy.

It was also expected that the accuracy of consumer perceptions would be affected by age, income, education, and number of children. In general, this expectation was not supported. Education and income had no effect. The only significant findings were positive correlations between age and price and the number of children living at home and operating costs. In both cases these results were expected.

The accuracy of consumer perceptions could have been affected for a number of reasons. However, it was shown in other tasks that all subjects knew the average useful life of refrigerator-freezers, and,when given the cost data in a mechanical task were able to calculate the total costs involved in owning and operating refrigerator-freezers reasonably accurately. Education may also be expected to be a factor in the accuracy of consumer perceptions. That is, higher educated subjects may be expected to perceive relationships between cost dimensions easier and more accurately and to abstract the specific information from one task to others better. Although there were no significant differences by education on consumers' overall perceptions of owning or operating costs, lower educated subjects had more difficulty in recognizing specific feature/product cost relationships. This is reflected in the higher MAD scores for the lower educated subjects in many cases.[1]

---

[1] Although, in general, lower educated subjects do have some trouble dealing with the increase in objective information, analysis of the levels of education by condition shows that the availability of the LCC information is taken advantage of by the lower educated subjects with positive results.

Another open-ended question asking subjects to explain why they did or did not choose features for inclusion in their model provides insight into a somewhat higher lever of consumer response. More subjects in the LCC condition than control indicated that product cost was an important element in evaluating feature alternatives. A number of reasons for this difference may be cited. Once the cost information was made available, subjects did comprehend the impact of dimensions such as energy on total product cost. This implies a change in consumers conceptual view of cost from the equating of cost with price to the more inclusive and long-term total cost framework. It seems, then, that without presenting consumers with specific cost data they will not, and cannot be expected to, comprehend the importance and magnitude of costs surrounding product features.

Those subjects having LCC information available to them were able to see the relationship between features and their various costs (i.e., LCC, energy/year, price, lifetime energy) significantly better than the control group which received only standard price information. This result implies that such information is not lost on the consumer and that he will spend time evaluating it if given the opportunity. The fact that consumers in the LCC condition did significantly better than the control in all cases except price indicate that consumers can comprehend the information. Also, since there was no significant difference by educational level on consumer perceptions of the helpfulness and complexity of the information, it would appear that the information is not too complex for lower educated subjects and is helpful in decision making. However, the significantly poorer showing by the LCC group regarding price brings up the important issue of the possibility of providing consumers with too much information.

Support for these conclusions can be found in questions concerning the helpfulness and complexity of the cost information. A significant difference was found between conditions in terms of how helpful the cost information was in making their decisions. The LCC group judged the information more helpful. However, no differences were found in perceived complexity, and both groups felt the information was "simple" to understand although the LCC group found it somewhat less simple than control. The reasons behind these responses involve two premises. First, it may be that the LCC information is not too complex to be understood or used in evaluation. But, it may also be that the LCC information was not evaluated in its most comprehensive framework. Some dimensions and interactions between components of the construct were probably missed and/or ignored. This, of course, is not unexpected given the short exposure to the construct by the subjects. The fact that they do see the information as more helpful and do comprehend it, if not fully, is still a positive finding at this stage.

However, these conclusions may be misleading. A number of findings ran contrary to the above results. In tasks where subjects had to recall or recognize cost/feature relationships, lower educated subjects did worse in over half of the tasks and in seven of nine cases where there were significant differences between educational levels.[2] It may be that lower educated subjects perceive the information as too complex to begin with and simply do not begin to utilize it or utilize it in only a superficial manner. It may also be that these consumers try to utilize the information but do, in fact, find it too complex. In addition, all subjects in the control condition did significantly better in recognizing price/feature relationships, and there was no difference across educational levels. Consequently, there are no clear-cut conclusions on this issue at the present time.

A more advanced level of consumer response is his liking or affect for products and features. Subjects liking for features was measured on five-point bipolar adjective scales. The only significant difference between conditions occurred in consumer's favorability toward the automatic ice maker. The LCC condition expressed a greater dislike for the feature than the control. Mean values for the other features are generally in the same direction but do not reach significance. A particularly interesting finding in this case is the nonsignificance of the energy package. Both groups evaluated this feature highly. The crucial point is whether this liking for such an energy saving feature will be transferred to behavioral activity.

---

[2] Breaking the education levels up by condition shows that while lower educated subjects do have some trouble in dealing with the increase in objective information, the availability of such information is taken advantage of with some improvement although not up to the level of higher educated subjects.

Impact in terms of actual behavioral choice represents the most advanced level of consumer response. Due to the limitations of the study, testing in this area was done using measures which were intended to approximate actual behavior. This study was concerned with consumer's feelings around what they considered wise choices between models of refrigerator-freezers and features.

Consumers were first asked to indicate their satisfaction with various models of refrigerator-freezers. Satisfaction was defined in terms of what was best for their family _and_ budget. The one strong significant difference occurred with regards to model four, the least energy efficient model of the six. It included both convenience features but no energy saving package. The LCC condition evaluated this model significantly lower than control This suggests that consumers in the LCC group do recognize the importance of energy in determining what is a wise product choice. This is further supported by the fact that Model 4 is the only model where the two conditions were on opposite sides of the scale. Also, consumers in the LCC condition put a significantly larger distance between their evaluations of energy efficient models and energy consuming models.

The fact that the most energy efficient model did not show significant differences appears due to the overwhelming favorability of the frost free feature. Consumers, especially those exposed to LCC information, are willing to pay for energy saving features. However, the energy costs associated with the convenience features, especially frost free, do not appear to be large enough to cause consumers to do without.

In order to study the effects of the individual features in greater detail, subjects were asked to choose those features they would have in their own model if given the opportunity. The only significant difference was that the LCC condition chose the energy package more than the control. While results for other features did not reach significance, mean values were generally in the right direction. The energy package result is important when evaluated in conjunction with consumers' affective responses for this feature. In the evaluative task both groups rated the feature favorably, but it took the presence of the actual cost data to cause consumers to feel that such a feature would be a wise choice. In fact, both groups were equally certain overall that they made the best judgment concerning product features that they could.

Besides the effect of the cost information, education, age, children, and household earnings were also expected to impact on consumer response. The number of children living at home does not appear to affect evaluations of models and features, age, education and income do. Increased earnings produce greater favorability towards convenience features while increasing age and education show a positive correlation with energy saving models and features and less favorability toward convenience features.

The above summary bears out the original speculation that the strongest results occur in levels of consumer response not totally concerned with behavior and behavior change. This is to be expected and, in fact, would be cause for concern with the validity of the study if results had been in the opposite direction or even consistently strong throughout. Given the "newness" of the information, the unique format, the short exposure time, and the comprehensiveness, it was expected that the effects of the information would not be as strong in the latter stages. The implications of these findings for public policy and directions for future research will be discussed in the next chapter.

CHAPTER 6

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

The amount and type of product information available to consumers is an increasing concern of various sectors of our society--consumers, business, government, etc. The major issues surround provisions of the most "effective" information and, subsequently, impact on consumers. An area of current focus includes provision of objective information and, more specifically, energy related information. This type of provision will, in essence, present "new" information to the consumer thus providing him with a more comprehensive information environment for evaluating products and brands.

Consequently, the purpose of this dissertation was to increase understanding of the impact on consumers' processing of new forms of product information. Specifically, research focused on objective product information including price, energy, and service costs presented as components of a newly organized index--life cycle cost. The research was also structured to allow for the analysis of the energy information alone. Consumer information processing (CIP) was focused on because of the nature of the information and concern with consumer impact. That is, focusing only on choice or purchase behavior as criteria for evaluating effectiveness is a stringent test for new product information, and is probably not the correct way for evaluating a program in the early stages--if at all. Also, utilization of only attitudinal type measures may not truly represent the impact of such information either. Instead, a range of consumer responses representing cognitive and affective, as well as behavioral, levels is needed in order to more thoroughly analyze the impact of new product information at this early stage. Subsequently, this study was set up to allow for evaluation of information and its impact in a more comprehensive light and to contribute to the development of stimuli targeted for future objective information provisions.

Policy Implications

There are a number of implications for policy resulting from the findings discussed in Chapter 5. Before the commitment is made to implement an information provision in this area, a variety of questions should be answered. Among them are:

(1) Will the information provision lead to more informed consumers?

(2) Will the information provision lead to a changing conceptualization of product cost

on the part of the consumer to an inclusion of energy and service costs as well as price resulting in a longer term view of the cost concept?

(3) Can consumers apply the information to product and brand evaluations effectively?

(4) Who will benefit from such a provision?

(5) Will the information provision lead to consumers changing their evaluations of energy consuming and energy saving features, and is there some probability that shifts in behavior will result?

Many of the findings in Chapter 5 can be used to gain insight into the above questions.

Will The Information Provision Lead To More Informed Consumers?

There is support for the presentation of objective information on this dimension. Letting control group responses represent what consumers know going into the situation and the responses of LCC and energy/year represent what is learned, the differences between groups show that consumers do learn from the presentation of the information. There were no significant differences between conditions in the kind of information they would like to have received while building their refrigerator-freezer, and control group subjects received only price. While interpretation of non-significant results is admittedly hard, one of two possible reasons appear likely. Either subjects did not make the association between energy and service costs and the features or they did not feel they were important enough to deal with. Further tasks indicate that subjects do realize the association between features and energy and service costs. Therefore, it may be that consumers do not consider them important for evaluation. Support for this premise comes from the perceived relationships between price and operating costs in one of the key findings of this project. Whereas those consumers in the control group tend to view price as greater, the LCC group shows a more correct relationship by indicating operating costs are greater. Also, the control group underestimates the magnitude of the operating costs for a given price while the LCC group perceived the correct relationship (i.e., operating costs greater than price).

There are any number of reasons why consumers might not consider the energy and service cost information important, and further research is needed to establish the exact reasons. However, two possibilities relate directly to the reasons behind the provision of the objective information. First, consumers may feel they have no control over the cost factor. That is, the energy consumption of the models is fairly constant so that energy is not an attribute which can be used to discriminate between brands. Second, consumers may feel that the amount of energy used by the appliance or feature is not significant enough to make the effort necessary to include it as an evaluative dimension. If further research shows either or both of these to be the case, the argument for availability of information which allows for easier comparisons and shows that differences do exist is strengthened.

A closely related issue involves the most effective way by which such information can be communicated. While the major concern of this study was with LCC, energy/year data was also represented. Findings in terms of which presentation provides the most effective results are not conclusive. There is some support for concluding that the LCC format produces the more significant results. There was a tendency for energy/year responses to fall between LCC and control. In addition, LCC information was judged significantly more helpful than energy/year data. There was some indication that the LCC information was better able to convey expenses while energy/year presented cost savings more effectively. But the energy/year group showed no significant differences from control in choice of the energy package while LCC did, and the LCC group showed a greater difference in evaluating models with energy saving features against those without. However, 81% of the energy/year group, 68% of the LCC group, and 68% of the control group said they would prefer cost/year data. If this preference translates to use, it may be better to go with an energy/year format. But, if it can be shown that over time the consumer will become more comfortable with the LCC format, this index may be more efficient because of its more comprehensive format and emphasis on the conceptualization of product cost in a longer term perspective.

Will The Information Lead To A Changing Conceptualization Of Product Cost?

The concern here is with what is learned being more than a specific cost figure (i.e., life cycle cost, life time energy cost, etc.) but rather a different conceptual view of product cost from the one dimensional association with price toward a multidimensional long-run concept. There is some evidence that this does happen with the presentation of LCC information. A greater percentage of subjects in the LCC condition indicated that product cost was an important element in evaluating feature alternatives. This suggests that a changed perspective results from the presentation of LCC information. The inclusion of energy and service costs in a long run total cost perspective seems to have made a difference. This is supported by findings showing that subjects in the LCC condition have a more accurate perception of the relationship between energy costs and price. This is most evident in the task that asks subjects which cost more over the life of the product--electricity or price. The majority conclusion of the control group (i.e., representing the current information environment) was price while the LCC group chose electricity (the correct response). These changing perceptions resulted in a significant difference in choice between control and LCC on the energy saving feature (i.e., energy package) with the LCC condition choosing it more.

Several other interesting facts apply to the availability of such cost information. The presentation of cost information is most effective when provided as actual data. The control group received a verbal explanation of the function of the energy package (i.e., that it saved energy), but their behavior was significantly different from the LCC group as shown above. The magnitude and importance of the costs was not conveyed by such a presentation. In order for change to occur, a format closer to actual data may have to be presented, but this brings up a trade-off between complexity and action. That is, providing actual cost figures will create a more complex environment. The question then becomes a matter of deciding if consumers can apply the more comprehensive cost concept.

Can Consumers Apply The Information To Product And Brand Evaluations Effectively?

Even if the main policy goal is to have the objective cost data available (e.g., Bymer's right to know concept, 1972) it will be important to know if consumers can utilize the data correctly or if it leads to unintended consequences. For example, the increased information may lead to confusion and misinterpretation of the data. This could result in consumers ignoring the information altogether because of its perceived and/or real complexity or lead to incorrect choices.

The findings with regard to consumers' ability to apply the new product information are not unequivocal. Subjects appear to be able to handle at least some aspects of the information but not without cost.

Consumers exposed to the LCC information are more accurate in their perceptions of price/operating cost relationships. The control condition underestimated the magnitude of operating costs in relation to price. In addition they said price was greater than life time energy costs which is the opposite of the price relationship (LCC subjects said electricity). Also, consumers who had the LCC information available did significantly better in recognizing cost/feature relationships. That is, learning does occur, and the information is not lost on the consumer. This is an important point in evaluating the potential of an information provision. That is, in a cost/benefit sense it should be established whether or not the information in this particular format will be used. It can be expected that the implementation of the program will increase product cost. This may be passed on in the form of higher prices. If the information will not or cannot be used by the public, then the question arises as to whether the implementation of the program in this form is justified.

A negative effect of the increased objective information does, in fact, occur. Consumers receiving the new information did significantly worse in recalling price of features. This raises the important question of whether the consumer can handle all of the information (i.e., Jacoby's concept of the possibility of too full a disclosure, 1974) without some negative effects. The LCC information was judged significantly more helpful than only price, and there were no significant differences in complexity ratings. This would appear to support a conclusion which states the increasing cost information is not too complex to be handled by consumers. However, given the consistent problem in recalling price, it is more probable that the information is complex, and consumers do have some difficulty in dealing with the total concept. This is not an unexpected conclusion. The information and the format are new to the subjects, and they were only exposed for a short time. However, further research should address the possibility that the confusion may continue to persist despite increasing exposure and familiarity.

Who Will Benefit From The Information?

Closely related to the question of whether or not consumers will be able to apply the new information effectively is the concern with who will benefit from the information. In the past, information programs have tended to benefit those who need it the least (i.e., higher educated and income consumers). Low educated (and usually lower income) consumers are least likely to take advantage of the information. And, lower educated subjects appear to have the most trouble with the more comprehensive cost information in this study. Although there were no differences between subjects in their overall perceptions of operating costs, lower educated subjects did do worse in recognizing specific feature/cost relationships (i.e., lower educated subjects showed significantly higher MAD's).

However, there were no differences by education in judging the complexity of the information, and all subjects indicated the information was helpful. Given the results of lower educated subjects in terms of MAD's, it appears that they are not using all of the available information or are using it but finding it too complex. Overall, lower educated subjects do not appear to benefit as much as higher educated subjects. But, the availability of the information does make a difference. When low education consumers were studied by condition, it was found that the introduction of LCC information did improve lower educated subjects' recognition of feature/cost relationships. This finding implies that lower educated subjects do try and deal with the information. Given the newness and comprehensiveness of the information, it is not unexpected that the lower educated consumer would find the information hard to deal with at first. In summary, at this stage lower educated consumers do have some trouble with the information, but they do utilize it and results are better than if the information were not available.

Will Consumers Change Their Evaluations, And Is There Some Probability That Shifts In Behavior Will Result?

There is some indication that consumers will shift their evaluations of product features, although it is not strong. Direction of means show LCC subjects tend to like energy saving features more and energy consuming features less than control group subjects although results are not significant. An interesting finding here is that there was no difference in evaluation of the energy package--both groups liked it.

At the most advanced level of consumer response, the question arises as to whether the information and changed evaluation will translate to behavior. Results in this area are equivocal. In the task asking for subjects to choose a model which was most satisfactory for their family and budget, it appears that the features were more important than the cost information. Out of six models, there was only one significant difference. The presentation of the cost information led to LCC subjects rating the most energy inefficient model more unsatisfactory than the control group. This finding is strengthened by the fact that LCC subjects showed larger differences between models with an energy package and those without. Overall, it appears that subjects are willing to pay for energy savings, but not at the expense of certain convenience features (e.g., frost free).

In another task attempting to approximate behavioral tendencies, results were not strong. The only significant finding (although means were in the predicted direction) was in the choice of the energy package. LCC subjects chose to include it more than the control. Interpreting this finding in light of the high evaluations the energy package received from all groups, it appears that it will be necessary to provide consumers with facts showing actual cost savings before consumers will make the trade-off between higher price and lower energy costs. This is important because it indicates subjects are engaging in some kind of trade-off analysis between cost components. If this, in fact, is occurring then there is a higher probability of subjects making more energy efficient choices over time.

Implications for Future Research

It is apparent from the previous discussion of policy implications that there are a number of areas open for future research, both in terms of following up these preliminary findings and expanding into new but related areas.

In terms of follow up research, one of the more pressing needs is for longitudinal studies in order to confirm these tentative results and to measure changes that might occur with increased exposure and familiarity. Day (1976) notes that the impact of new product information will be greatest at initial levels of consumer response such as awareness and interest, but only as the consumer becomes more familiar with the information over time and through experience will one be able to truly judge the impact in terms of more advanced levels of response such as purchase behavior. There is need for such research to determine whether or not consumers will be able to deal effectively with the information, to determine if lower educated consumers will be able to handle the information, to determine the most effective format for the information, and to observe whether changes in consumer attitudes translate to purchase behavior.

Additional research is needed in a number of other areas. Consumers' attitudes and knowledge of energy costs need to be explored. Insight into why such dimensions are not viewed as important in evaluating and discriminating between products and brands would be valuable in structuring a provision in this area and in developing a coordinated consumer education program.

Research aimed at understanding the exact nature of trade-offs that occur between cost components would also prove valuable. Obviously costs are not judged independently of each other. How they might be evaluated separately may not be the same as evaluating them together. For example, when a consumer is confronted with a particular price for a product, he may evaluate the cost favorably. However, when he is presented with price plus a certain energy figure, his evaluation of price may be different. The level at which trade-offs between such dimensions as price and energy and even convenience occur would be valuable in understanding how consumers process such information and the relative importance of the dimensions.

Information has various dimensions, but what the relationship between them and the impact of new product information is not always clear. Additional research is needed in exploring dimensions such as complexity and certainty surrounding new information. It may be that consumer recognition of the complexity of the information is needed in order for subjects to be more certain of their choices. That is, they are able to recognize all the interactions of the components and utilize them in making their choice. On the other hand, the information may be so complex as to produce tremendous uncertainty in choice. Answers to questions concerning when objective information ceases to produce positive results as a function of its comprehensiveness and when it starts producing dysfunctional consequences would be valuable in structuring the environment. Also, what happens to these relationships over time should be of concern.

There are a number of areas closely related to this that would increase our insight into the relationship between the availability of new product information and consumers' processing of such information. In the case of durable goods especially, the decision process is very often a joint one between husband and wife. Research exploring such a dyadic approach to the decision process would prove valuable not only in a consumer behavior sense but a policy sense as well. It would provide information concerning who is responsible for what parts of the process as well as who is concerned with, and responsible for, particular dimensions.

In light of findings concerning consumer ability to deal with objective information and his perceptions of particular dimensions, a consumer education program in conjunction with a provision is a possibility. Research to determine the most effective information program in terms of content, determining who it should reach, and evaluation techniques once it is implemented will be needed.

It should not be expected that consumers evaluations of products and brands will be based on the current information only. Past experience, knowledge, and attitudes may be expected to interact with the new product information. Studies exploring these dimensions and how they interact with new information may provide valuable insight in understanding why consumers respond the way they do. This information could then be used to structure the information environment to account for these factors.

Conclusion

The major purpose of this dissertation was to increase understanding of the impact on consumers' processing of new forms of product information, specifically the life cycle cost measure developed in the M.I.T. Report. An additional concern was with consumers' processing of energy related information. Impact of the information was measured at various levels of consumer response. The results are advanced as a preliminary, and even descriptive, investigation concerning the impact of objective product information, and to give insight into possible information provisions in this area.

The overall conclusion of this study is that some cost information in addition to the traditional price data is desirable. Consumers find such information helpful and appear to utilize it in at least some situations. There is additional evidence that consumers' existing knowledge in the area of energy and its relation to products and other costs is lacking. Providing objective information of the type explored in this dissertation holds promise as a valuable tool for consumers. However, more research needs to be done in determining the exact nature of the information to be presented and what its impact, especially in the long run, is likely to be.

APPENDICES

APPENDIX I

RESULTS FOR ENERGY COST PER YEAR
PRODUCT INFORMATION

An energy cost/year condition was used in this study in order to aid another dimension to new product information. Since energy/year data will be made available to the public in the near future, it was felt that consumer response to this type of information would provide interesting comparisons with both the more comprehensive LCC information and the current information environment (i.e., price). Energy/year data was presented along with a range of cost figures for similar models or features. In this way, subjects are able to determine the average yearly cost for the model and see how that cost figure ranks among similar models.

There are two basic questions to be answered in the energy/year case. First, will energy/year data improve consumer performance? Second, does LCC information accomplish the purpose better than energy/year data?

Results of tasks exploring consumer awareness provided no significant differences between energy/year and control or LCC. Responses to questions asking subjects what other information they would like to have in evaluating models produced no significant differences across conditions as did questions asking subjects to list those factors involved in operating a refrigerator-freezer. Results once again supporting the premise that consumers who do not receive cost information (i.e., LCC or energy/year) are less likely to be aware of its importance.

In tests of consumer accuracy involving the interrelationships of cost dimensions, LCC fared somewhat better than energy/year. Perceptions of cost to own an average model by the energy/year group were much closer to the control groups estimate (energy/year $\bar{X}$=\$577.88, Control $\bar{X}$= \$577.04). Perceptions of operating cost were more in line with LCC's estimates (LCC $\bar{X}$=\$1158, energy/year $\bar{X}$=\$985, Control $\bar{X}$=\$510). Both energy/year and LCC were significantly different from the control group in their perceptions (LCC, p=.002; energy/year, p=.046), but the LCC perceived relation between the cost dimensions is somewhat more accurate. In addition, there is no difference between LCC and energy/year in their perceptions of which cost more over the life of a product--electricity or price (X^2=.313, p=.58). Both are significantly different from control (LCC, X^2=6.69, p<.01; energy/year, X^2=2.899, p=.09).

There were no differences between groups in their estimation of product life or in the mechanics of figuring out costs. Overall the differences between LCC and energy/year conditions were not great. However, what differences there were favored LCC in both awareness and accuracy. Responses by energy/year tended to be in the middle of those given by the other two conditions.

In response to a question concerning why the subjects chose or did not choose a particular feature, an examination of the percentage differences between the groups provides insight into how consumers evaluate features (Table 13). Eight features were of interest--size, side by side doors, top freezer door, frost free, automatic ice maker, ice and water dispenser, energy package, and service contract. Four of the features were evaluated almost identically by LCC and energy/year. The other four show interesting differences. Only 11.1% of the energy/year group considered cost a factor in evaluating a side by side freezer while 28.1% did in the LCC condition. The 11.1% is, in fact, a lower percentage than the control group's (17.9%). The percentages improved slightly for deciding on a top freezer but the energy/year group still considered cost less than LCC (LCC, 27.5% v energy/year, 19.1%). The 19.1% was better than the control (15.3%). LCC also considered the cost dimension more than energy/year in evaluating the automatic ice maker (41.9% v 25.9%) and ice and water dispenser (49.9% v 32%). In both cases, however, the energy per year group did better than the control (13.7% and 28.6% respectively).

In examining differences between conditions based on their MAD's (i.e., the absolute difference between the subject's response and the true response to the cost/feature combination), no significant differences occur between LCC and energy/year when features are collapsed by cost category (Table 14). Both groups are significantly different, and have lower MAD's, than the control group. On a feature by feature basis the LCC group tended to recall that information that was available to them better than the energy/year. The same relationship held for the energy/year group. That is, it tended to recall the information available to it (i.e., yearly energy cost) somewhat better than LCC. However, both conditions did significantly worse than the control group in terms of price recall.

In terms of the helpfulness of the cost information, LCC was judged more helpful than energy/year (p=.03), and there was no significant difference between energy/year and control (p=.66). All three conditions judged the information to be helpful. LCC information was also seen as more complex than energy/year (p=.04).

These overall results concerning product cost information provide some interesting conclusions. First, it appears that the product information does improve consumer performance over the existing information environment. But, the consistent result is that the energy/year information is somewhat less effective in this area than LCC information. Mean values and percentage responses to tasks tend to fall in the middle for energy/year subjects. For example, in looking at the MAD's by educational level within groups, the low education subjects did significantly worse in 7 cases. The introduction of LCC information improved responses in 6 cases versus 3 for energy/year.

Another level of consumer response involves their liking for models and product features. There are no significant differences between energy/year and control conditions in the task exploring this affective stage. However, an examination of the mean values between energy/year and LCC does yield some interesting results. In an examination of nine features, the LCC group showed a tendency to dislike energy consuming convenience features more than the energy/year condition. Only 26.7% of the subjects in the energy/year group indicated they disliked or did not care about an automatic ice maker compared to 36.4% of the LCC group. This same relationship held for frost free (energy/year, 0% v LCC, 9.1%), ice and water dispenser (energy/year, 51.7% v LCC, 57.6%), and side by side doors (energy/year, 43.4% v LCC, 60.6%). In all three evaluations of sizes, the LCC condition had fewer percent indicating they disliked the sizes. They disliked the 16 cubic foot model less (energy/year, 50% v LCC, 39.3%) and the 19 cubic foot model less also (energy/year, 25.9% v LCC, 19.3%). Also, 42.3% of the subjects in the energy/year condition indicated they felt a 22 cubic foot model was either "very good" or "a must to buy." The LCC condition only had 26.1% of the subjects respond in this manner.

However, two important features did not have the percentage response in favor of the LCC condition. They were the energy package (LCC=33.4%, Energy/year=30%) and the service contract (LCC=60.6%, Energy/year=48.2%). In both cases, the LCC condition expressed a more negative evaluation for the two operating cost saving features. The fact that subjects in the LCC condition would not look too favorably on the service contract is not too surprising. The information given the LCC subjects showed that by purchasing the service contract they would only break even in total cost. It might then be expected that approximately 50% would choose it and 50% not choose it. However, the fact that both "saving" features were evaluated less negatively in the energy/year condition may mean that the energy/year data does a better job in conveying cost saving information while the LCC is somewhat better in pointing out expenses.

The most advanced consumer response is purchase behavior. Several tests in this study attempted to approximate consumers' behavioral tendencies. In the model satisfaction task, there were no significant differences between LCC and energy/year, and the same results occurred between energy/year and control as between LCC and control. Results of analysis for main effects were also the same except for comparisons between models one and three. The energy/year group judged model three somewhat more satisfactory than LCC. While the difference was small, it does support the earlier premise that energy/year data does convey energy savings somewhat more efficiently since model three had only the energy package feature.

In evaluating the models with energy features versus those without, the LCC group showed a greater distance between models on the satisfaction scale than energy/year (p=.089) and control (p=.013). However, the energy/year group did not show a significant difference from control (p=.351). The mean distances for the groups were 4.91 for LCC, 3.4 for energy/year, and 2.4 for control.

The results of the building task support the above results. There were no significant differences between energy/year and control. In addition, the percentage of consumers choosing the energy consuming features was greater in the energy/year group than LCC. A size greater than 19 cubic feet was chosen by 23.3% of the energy/year group compared to 12.1% of the LCC group. Fifty three percent of the energy/year group chose the more energy inefficient side by side doors compared to 30% for the LCC condition. The energy/year condition had a greater percentage choosing automatic ice makers (73.3% _v_ 48.5%) and ice and water dispensers (30% _v_ 27.3%) compared to LCC. Finally, while 90.9% of the subjects in LCC chose the energy package, only 76.7% of the subjects in the energy/year group did so.

In all levels of consumer response, the LCC and energy/year conditions did comparably. Both appear to be improvements over the present information environment. The LCC condition does produce somewhat greater impact than energy/year in terms of the recognition of the costs attached to convenience features. This result comes through despite the more comprehensive and complex nature of LCC data. However, the energy/year data appears to convey cost savings more effectively than LCC. Also, when asked which type of information they prefer, 68% of LCC and control subjects and 81% of the energy/year subjects preferred to get cost per year data. Two important questions for future research then are whether subjects will be more likely to use energy/year data because of their familiarity with it, and will the consumer change his perceptions of cost over time and become more comfortable with the more comprehensive LCC information?

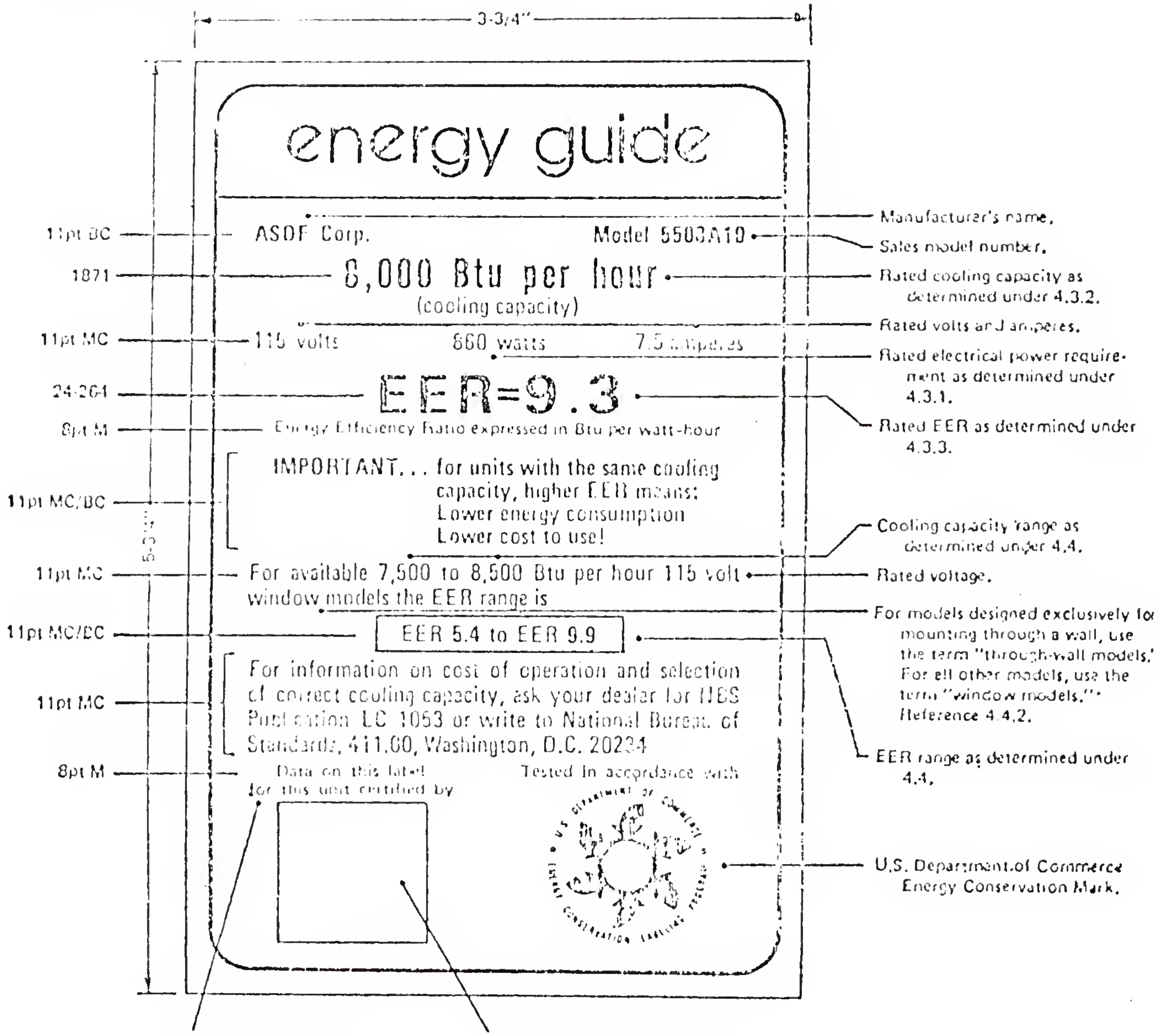
APPENDIX II

EXAMPLES OF LABELS UNDER THE VOLUNTARY LABELING PROGRAM

TYPE STYLE GUIDE

(Use type styles specified below or equivalent)

Type styles 1871 and 24 264 are from the Varityper Headliner. Everything else is UNIVERSE type from the IBM Selectric Composer. M Medium, MC=Medium Condensed, BC - Bold Condensed.



energy guide

ASDF Corp. Model 5503A10

8,000 Btu per hour
(cooling capacity)

115 volts 860 watts 7.5 amperes

EER=9.3
Energy Efficiency Ratio expressed in Btu per watt-hour

IMPORTANT. . . for units with the same cooling capacity, higher EER means:
Lower energy consumption
Lower cost to use!

For available 7,500 to 8,500 Btu per hour 115 volt window models the EER range is

EER 5.4 to EER 9.9

For information on cost of operation and selection of correct cooling capacity, ask your dealer for NBS Publication LC 1053 or write to National Bureau of Standards, 411.00, Washington, D.C. 20234

Data on this label for this unit certified by

Tested In accordance with

Manufacturer's name.

Sales model number.

Rated cooling capacity as determined under 4.3.2.

Rated volts and amperes.

Rated electrical power requirement as determined under 4.3.1.

Rated EER as determined under 4.3.3.

Cooling capacity range as determined under 4.4.

Rated voltage.

For models designed exclusively for mounting through a wall, use the term "through-wall models." For all other models, use the term "window models."* Reference 4.4.2.

EER range as determined under 4.4.

U.S. Department of Commerce Energy Conservation Mark.

This wording optional if seal, logo or other designation of manufacturer or agency certifying rating values includes wording of same meaning.

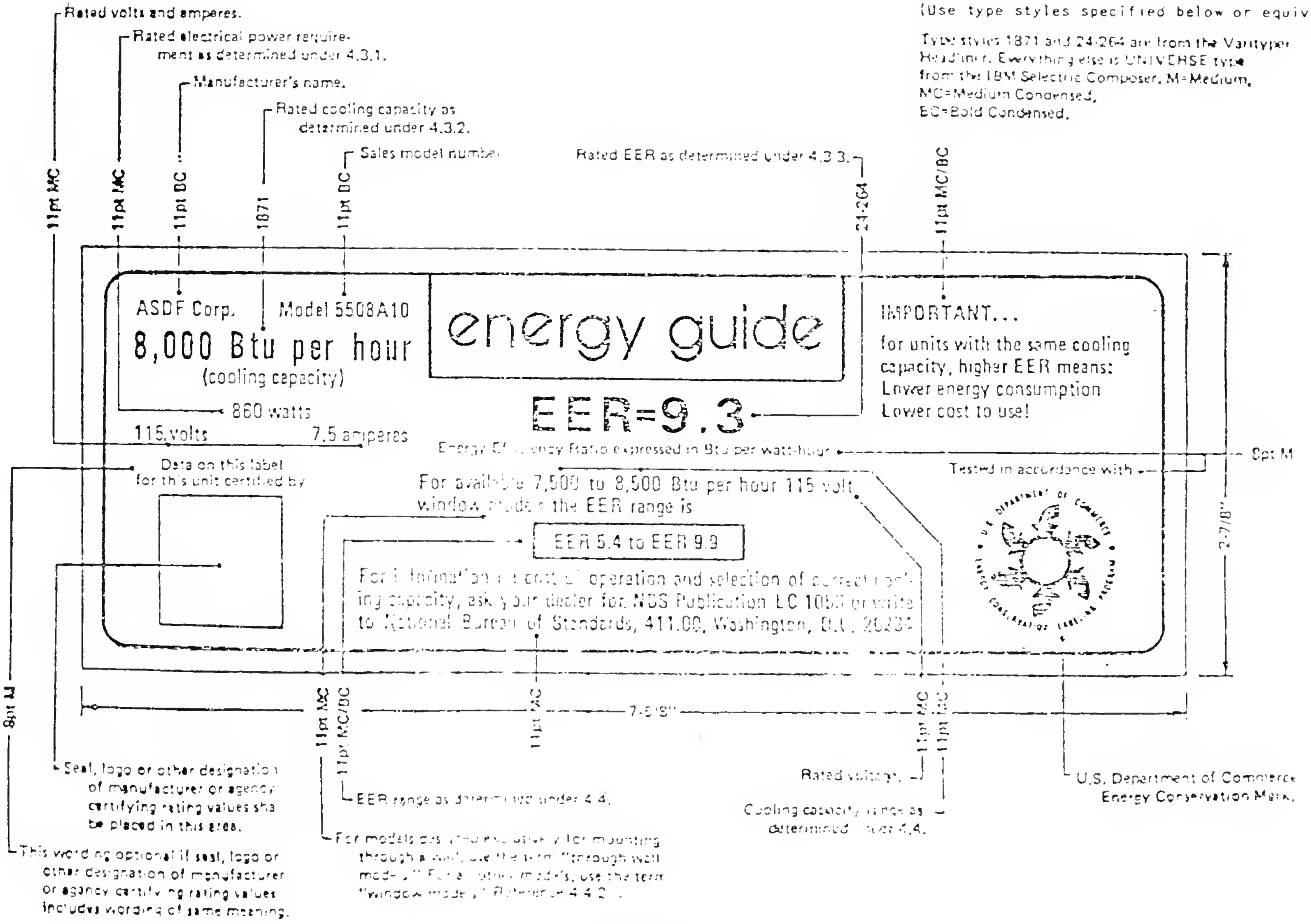
Seal, logo or other designation of manufacturer or agency certifying rating values shall be placed in this area.

FIGURE 1

TYPE STYLE GUIDE

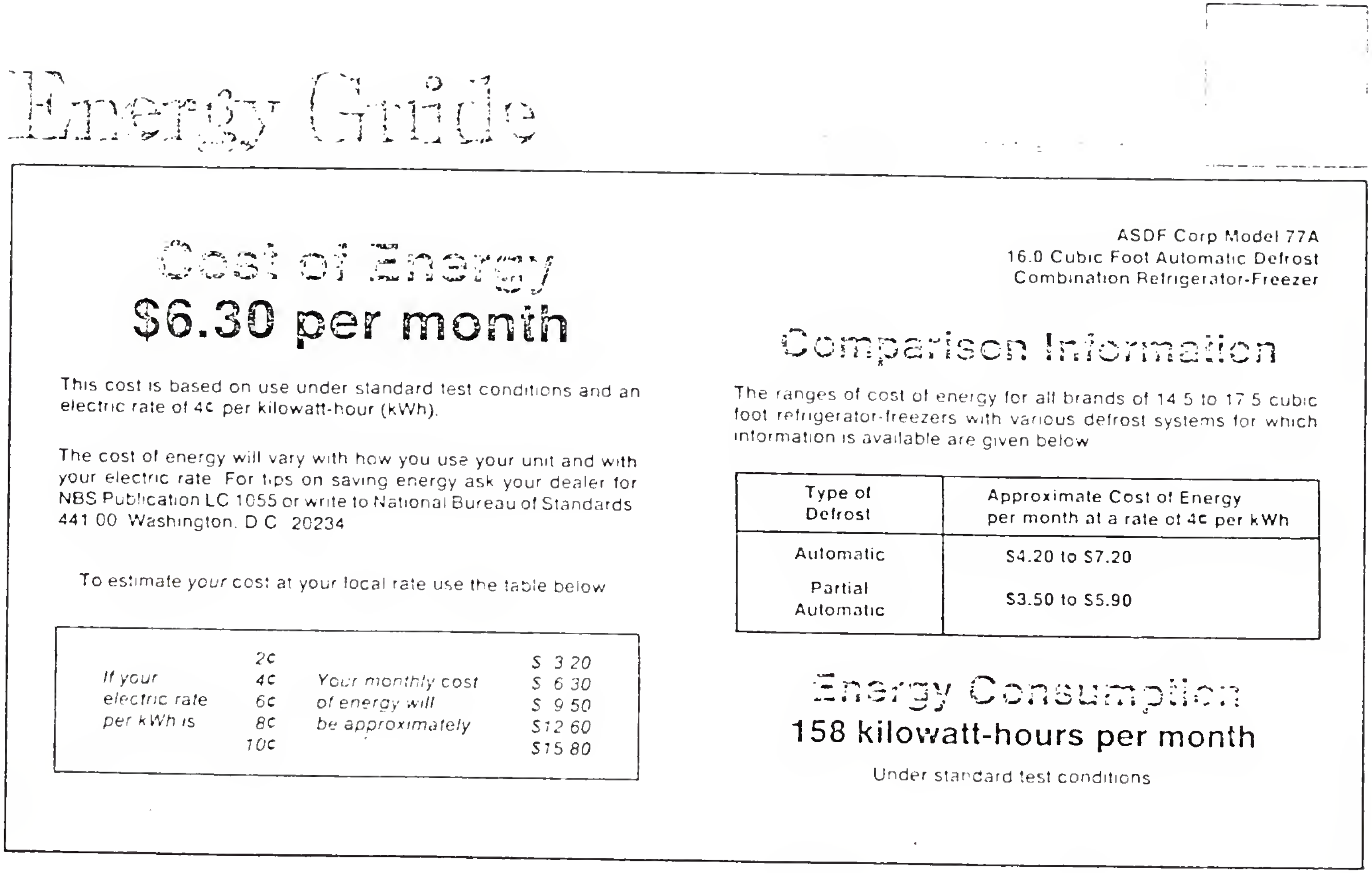
(Use type styles specified below or equivalent)

Type styles 1871 and 24-264 are from the Varityper Headliner. Everything else is UNIVERSE type from the IBM Selectric Composer. M=Medium, MC=Medium Condensed, BC=Bold Condensed.



Rated volts and amperes.
Rated electrical power requirement as determined under 4.3.1.
Manufacturer's name.
Rated cooling capacity as determined under 4.3.2.
Sales model number
Rated EER as determined under 4.3.3.
11pt MC
11pt MC
11pt BC
1871
11pt BC
24-264
11pt MC/BC
ASDF Corp.
Model 5508A10
8,000 Btu per hour
(cooling capacity)
860 watts
115 volts
7.5 amperes
energy guide
EER=9.3
IMPORTANT...
for units with the same cooling capacity, higher EER means:
Lower energy consumption
Lower cost to use!
Energy Efficiency Ratio expressed in Btu per watt-hour
8pt M
Tested in accordance with
Data on this label for this unit certified by
For available 7,500 to 8,500 Btu per hour 115 volt window models the EER range is
EER 5.4 to EER 9.9
For information on cost of operation and selection of correct cooling capacity, ask your dealer for NBS Publication LC 1053 or write to National Bureau of Standards, 411.00, Washington, D.C. 20234
U.S. DEPARTMENT OF COMMERCE • ENERGY CONSERVATION LABELING PROGRAM
2-7/8"
7-5/8"
8pt M
11pt MC
11pt MC/BC
11pt MC
11pt MC
11pt BC
Seal, logo or other designation of manufacturer or agency certifying rating values shall be placed in this area.
This wording optional if seal, logo or other designation of manufacturer or agency certifying rating values includes wording of same meaning.
EER range as determined under 4.4.
For models designed exclusively for mounting through a wall, use the term "through-wall models." For all other models, use the term "window models." Reference 4.4.2.
Rated voltage.
Cooling capacity range as determined under 4.4.
U.S. Department of Commerce Energy Conservation Mark.

FIGURE 2



Energy Guide

ASDF Corp Model 77A
16.0 Cubic Foot Automatic Defrost
Combination Refrigerator-Freezer

Cost of Energy

$6.30 per month

This cost is based on use under standard test conditions and an electric rate of 4¢ per kilowatt-hour (kWh).

The cost of energy will vary with how you use your unit and with your electric rate. For tips on saving energy ask your dealer for NBS Publication LC 1055 or write to National Bureau of Standards 441.00 Washington, D.C. 20234

To estimate *your* cost at your local rate use the table below

If your electric rate per kWh is		*Your monthly cost of energy will be approximately*	
	2¢		*$ 3.20*
	4¢		*$ 6.30*
	6¢		*$ 9.50*
	8¢		*$12.60*
	10¢		*$15.80*

Comparison Information

The ranges of cost of energy for all brands of 14.5 to 17.5 cubic foot refrigerator-freezers with various defrost systems for which information is available are given below

Type of Defrost	Approximate Cost of Energy per month at a rate of 4¢ per kWh
Automatic	$4.20 to $7.20
Partial Automatic	$3.50 to $5.90

Energy Consumption

158 kilowatt-hours per month

Under standard test conditions

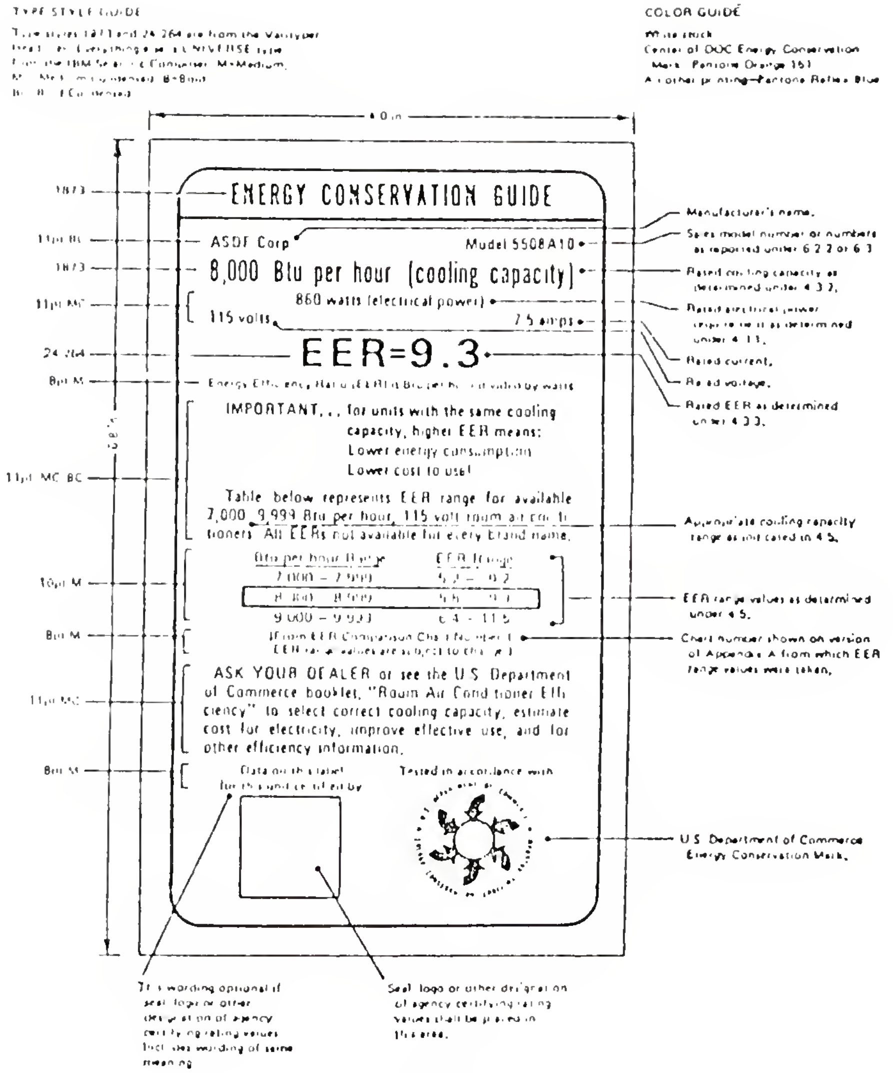

TYPE STYLE GUIDE
Type styles 18/73 and 24 264 are from the Varityper
Headliner. Everything else is UNIVERSE type
from the IBM Selectric Composer. M=Medium,
MC=Medium Condensed, B=Bold,
BC=Bold Condensed
COLOR GUIDE
White stock
Center of DOC Energy Conservation
Mark: Pantone Orange 151
All other printing—Pantone Reflex Blue
4.0 in
18/73
11pt BC
18/73
11pt MC
24 264
8pt M
11pt MC BC
10pt M
8pt M
11pt MC
8pt M
ENERGY CONSERVATION GUIDE
ASDF Corp
Model 5508A10
8,000 Btu per hour (cooling capacity)
860 watts (electrical power)
115 volts
7.5 amps
EER=9.3
Energy Efficiency Ratio (EER) is Btu per hour divided by watts
IMPORTANT . . . for units with the same cooling capacity, higher EER means:
Lower energy consumption
Lower cost to use!
Table below represents EER range for available 7,000–9,999 Btu per hour, 115 volt room air conditioners. All EERs not available for every brand name.
Btu per hour Range
EER Range
7,000 – 7,999
5.2 – 9.2
8,000 – 8,999
5.8 – 9.9
9,000 – 9,999
6.4 – 11.5
(From EER Comparison Chart Number 1
EER range values are subject to change.)
ASK YOUR DEALER or see the U.S. Department of Commerce booklet, "Room Air Conditioner Efficiency" to select correct cooling capacity, estimate cost for electricity, improve effective use, and for other efficiency information.
Data on this label for this unit certified by
Tested in accordance with
Manufacturer's name.
Sales model number or numbers as reported under 6.2.2 or 6.3.
Rated cooling capacity as determined under 4.3.2.
Rated electrical power input as determined under 4.3.1.
Rated current.
Rated voltage.
Rated EER as determined under 4.3.3.
Appropriate cooling capacity range as indicated in 4.5.
EER range values as determined under 4.5.
Chart number shown on version of Appendix A from which EER range values were taken.
U.S. Department of Commerce Energy Conservation Mark.
This wording optional if seal, logo or other designation of agency certifying rating values includes wording of same meaning.
Seal, logo or other designation of agency certifying rating values shall be placed in this area.

FIGURE 1

[Voluntary Energy Conservation Specification 1-74]

APPENDIX A – *Range of Energy Efficiency Ratios for Room Air Conditioners*

(EER Comparison Chart No. 1)

Cooling capacity range—B t u per hour	Energy efficiency ratio range	
	115 volt units	Higher voltage units
Up to 4,999	5.2 to 5.4	
5,000 to 5,999	5.1 to 8.8	
6,000 to 6,999	5.6 to 10.5	5.1 to 6.1.
7,000 to 7,999	5.2 to 9.2	6.3 to 6.3
8,000 to 8,999	5.8 to 9.9	4.9 to 6.7.
9,000 to 9,999	6.4 to 11.5	4.8 to 8.0.
10,000 to 10,999	6.2 to 12.0	5.3 to 8.0.
11,000 to 11,999	8.0 to 8.5	4.7 to 7.4.
12,000 to 12,999	8.7 to 9.6	4.7 to 8.3.
13,000 to 13,999	9.1 to 10.0	4.4 to 8.5.
14,000 to 14,999	10.1 to 10.3	5.1 to 8.0.
15,000 to 15,999		4.8 to 8.0.
16,000 to 17,999		5.8 to 8.5.
18,000 to 19,999		5.8 to 9.3.
20,000 to 23,999		5.7 to 8.1.
24,000 to 27,999		6.1 to 7.6.
28,000 to 31,999		6.0 to 7.8.
32,000 to 36,000		6.2 to 7.1.

From data supplied by the Association of Home Appliance Manufacturers. Includes only units operating on 60 hertz electrical service.

[FR Doc.74-2155 Filed 1-30-74;8:45 am]

APPENDIX III

INSTRUMENT

Subjects received three separate sections. The first included the subject release form, introduction, background information, and the model evaluation task. The second part contained all the material associated with the building task, and was presented in a large manila envelope. The third part contained sets of questions and task referring to the completed building task as well as other relevant questions. Demographic questions were elicited last.

On the following pages is the instrument presented to the LCC condition. Those pages which differed between LCC and the other conditions are presented in the back of this appendix.

The purpose of this study is to gain knowledge concerning how consumers feel about refrigerator-freezers. You will be asked to give your evaluations of different models of refrigerator-freezers and to show what features you would be most likely to include in the refrigerator-freezer you would be most likely to purchase.

This session will take approximately one hour and your organization will receive two dollars for your participation. I will be glad to answer any questions you might have about the task, and you are free to withdraw from the task at any time with no consequences.

I have read and I understand the procedure describe above. I agree to participate in the procedure and I have received a copy of this description.

Subject ______________________________

Witness ______________________________

Investigator ______________________________

Number ____________

INTRODUCTION

The smart businessman will want to build a product that best suits the needs and wants of the consumer. Before this can be done, he has to discover what the consumers feel are best for them and their families.

The goal of this study is to find out what kinds of refrigerator-freezers best suit the needs and wants of today's consumers. Since needs and wants of consumers vary a great deal, there really is no one "best" refrigerator-freezer which can be produced to satisfy all consumers. So, we would like you to tell, and show, us what kind of refrigerator-freezer best suits _your_ own family and budget.

Because consumers' needs and wants vary, each of you will use different information and evaluate the refrigerator-freezers in your own way. Therefore, any questions you might have will probably not be of interest or apply to your neighbor's situation. Consequently, if you have a question, please raise your hand, and I will answer it personally without bothering the rest of the group.

We have asked you to sign your name on the cover of the booklets in order to help us identify the organization you are representing. This will be done by matching your name with the list provided by your organization. In this way, your organization can be promptly paid for your participation. After we collect the booklets, the page with your name on it will _immediately be removed_ from the rest of the booklet and placed in a separate stack. _Consequently, your name will not be associated in any way with the booklet._

STOP - _DO NOT CONTINUE_.

What Kind of Refrigerator-Freezer Do You Have?

Please tell about your refrigerator-freezer by answering the following questions and by placing a check mark in the space that best represents your refrigerator-freezer.

1. How long have you been using your current refrigerator-freezer?

____	____	____	____	____	____	____
0-1 year	2-4	5-7	8-10	11-13	14-16	17 or more years

2. What is the brand name of your refrigerator-freezer? ______________

3. What size if your refrigerator-freezer? In order to show the most nearly correct answer, place a check mark in only one of the six boxes below.

	I AM SURE MY MODEL IS IN THIS RANGE	I AM NOT SURE BUT I THINK IT IS IN THIS RANGE
a. 14 cubic feet or smaller. Refrigerator-freezers in this size range are considered to be small. They are found most in apartments.	☐	☐
b. 15-18 cubic feet. These are medium sixed models. They are most commonly associated with families of 2 to 4.	☐	☐
c. 19 cubic feet or larger. Models in this range are considered large.	☐	☐

4. Please estimate, as closely as possible, exactly how many cubic feet your refrigerator-freezer has: ______________

5. How sure are you of your answer to number 4?

Sure _____ Somewhat sure _____ Not sure at all _____

6. Which of the following features does your refrigerator-freezer have?

	YES, my refrigerator-freezer includes this feature	No, my model does not include this feature	I am NOT SURE if it does or does not include this feature
a. Adjustable shelves	___	___	___
b. Automatic ice maker	___	___	___
c. Color other than white	___	___	___
d. Frost free	___	___	___
e. Ice & water dispenser	___	___	___
f. Power saving switch	___	___	___
g. Side by side doors	___	___	___
	___	___	___

STOP - DO NOT CONTINUE

WHAT MODEL OF REFRIGERATOR-FREEZER IS BEST FOR YOUR FAMILY?

We would like to find out how you, the consumer, feels about some of the models which make up the basic line of refrigerator-freezers. Pretend that you are a consumer who is interested in learning more about refrigerator-freezers. You will be given a chart representing 6 basic refrigerator-freezer models. For the purposes of this task, assume that each model is available in the size and color you would prefer. In a later section you will have a chance to deal with all the features associated with a model, but for now we are only concerned with the ones provided.

Below is an example showing how the models will be presented. To find out information about one of the models, read below that model. Look at Model 1. The Automatic Ice Maker is "NOT IN THIS MODEL," the Energy Package is "NOT IN THIS MODEL," but the Frost Free feature is "INCLUDED IN THIS MODEL." Now look at Model 2. The Automatic Ice Maker is also "NOT IN THIS MODEL." The Energy Package is "INCLUDED IN THIS MODEL," but the Frost Feature is "NOT IN THIS MODEL." In addition, cost information will be given at the end of each model.

		MODELS	
		Model 1	Model 2
FEATURES	Automatic Ice Maker	Not In This Model	Not In This Model
	Energy Package	Not In This Model	Included In This Model
	Frost Free	Included In This Model	Not In This Model

Important

(1) Read the description of the features first.
(2) Then, carefully look over all the information in the chart.
(3) Answer the questions that follow.

STOP - DO NOT TURN THIS PAGE.

PLEASE TURN TO THE NEXT PAGE

DESCRIPTIONS OF FEATURES:

[a]The AUTOMATIC ICE MAKER freezes the cubes and releases them into the server automatically, so there is no more fumbling with ice trays.

[b]The ENERGY PACKAGE contains a number of new features and design changes, such as a power saving switch and more efficient motor, which will reduce electricity.

[c]The FROST FREE feature keeps the model completely free of frost in both the freezer and refrigerator. No defrosting of any kind is ever needed.

[d]LIFE CYCLE COST is the total amount of money a consumer will spend to own and use a model over its life (average life of a refrigerator-freezer is 14 years). The suggested retail price is used, and accurate energy and service costs are determined by industry and government scientists. Life cycle costs will be different for different models.

REFRIGERATOR-FREEZER MODELS CHART

MODELS

(assume that each model would be available in the size and color that you prefer and with any standard features)

FEATURES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
[a]Automatic Ice Maker	Not In This Model	Not In This Model	Not In This Model	Included In This Model	Not In This Model	Included In This Model
[b]Energy Package	Not In This Model	Not In This Model	Included In This Model	Not In This Model	Included In This Model	Included In This Model
[c]Frost Free	Not In This Model	Included In This Model	Not In This Model	Included In This Model	Included In This Model	Included In This Model
[d]Life Cycle Cost	Price $ 350 Energy 672 Service 75 TOTAL $1097	Price $ 430 Energy 1142 Service 115 TOTAL $1687	Price $ 475 Energy 504 Service 72 TOTAL $1051	Price $ 505 Energy 1253 Service 125 TOTAL $1883	Price $ 555 Energy 722 Service 94 TOTAL $1371	Price $ 630 Energy 753 Service 100 TOTAL $1483

Think about each model separately. Please rate each of the 6 models in terms of how satisfactory it would be in meeting the needs and wants of your family.

MODEL	VERY SATISFACTORY	SATISFACTORY	SOMEWHAT SATISFACTORY	NEITHER SATISFACTORY NOR UNSATISFACTORY	SOMEWHAT UNSATISFACTORY	UNSATISFACTORY	VERY UNSATISFACTORY
Model 1	____ +3	____ +2	____ +1	____ 0	____ -1	____ -2	____ -3
Model 2	____ +3	____ +2	____ +1	____ 0	____ -1	____ -2	____ -3
Model 3	____ +3	____ +2	____ +1	____ 0	____ -1	____ -2	____ -3
Model 4	____ +3	____ +2	____ +1	____ 0	____ -1	____ -2	____ -3
Model 5	____ +3	____ +2	____ +1	____ 0	____ -1	____ -2	____ -3
Model 6	____ +3	____ +2	____ +1	____ 0	____ -1	____ -2	____ -3

You have just rated each model in terms of your family's needs and your budget. Now we would like you to rate each model only in comparison to the other models. The same rating may be given to more than one model.

MODEL	BEST OF THE SIX TO BUY	GOOD BUT THE THE BEST	O.K., NOT PARTICULARLY GOOD OR BAD	BAD BUT NOT THE WORST TO BUY	WORST TO BUY
Model 1	____	____	____	____	____
Model 2	____	____	____	____	____
Model 3	____	____	____	____	____
Model 4	____	____	____	____	____
Model 5	____	____	____	____	____
Model 6	____	____	____	____	____

CONTINUE ON TO THE NEXT PAGE.

BUILDING TASK MATERIAL

(given to subjects in a manila envelope)

DO IT YOUR WAY

You have just looked at six basic models of refrigerator-freezers. Evaluating these models was not as realistic as it could have been because of the small number of features you had to choose from. Now we would like you to have some fun. In this session you will be able to pick the features you want and "build" your very own refrigerator-freezer. So, put on your construction hat and let's get started.

Building Blocks

This is a list of features that can be included in a refrigerator-freezer.

a. size in cubic feet
b. side by side doors or top freezer
c. color
d. frost free
e. adjustable shelves
f. automatic ice maker
g. ice and water dispenser
h. energy package
i. service contract
j. rollers

How Do You Build a Refrigerator-Freezer?

Answer - Just pull a tab.

(1) Look at your sheet of tabs. To build your refrigerator-freezer, simply pull off the tab which represents the feature you want and place it on the model to the right of the numbers.

(2) Start at the top of the sheet and work through all the features. The first thing you will choose is the size. For example, if you decide to have a 17 cubic foot model, simply pull that tab and place it to the right of number 1. Beside number 2 you will place either "side by side" or "top freezer," whichever you prefer. Beside number 3 will go the "color" you want and so on, until you have gone through all the features. When you have finished, you will have one tab by each number.

(3) If you decide later that you want a different feature from the one you picked, simply pull the one you would rather have now and place it over the feature you wish it to replace. For example, if you decide a "22 cubic foot" model is better than the "17 cubic foot" model you originally picked, simply pull the tab labeled "22 cubic feet" and place it over the "17 cubic feet" tab on the model.

(4) Notice that by placing the tabs directly below each other, you can easily keep track of the cost of the model. Each cost figure is an average figure; therefore, it is the most likely for that feature.

(5) The cost information on the tabs may be explained as follows:

Pr = price,	This is the manufacturer's suggested retail price.
En = energy,	It is the total energy cost to run that feature over the life of the model (14 years)
Ser = service,	It is how much you will have to pay to keep the feature in working order over the life of the model (14 years).
LCC = Life cycle cost.	This is the sum of all dollars paid during the feature's life (14 years). It may include price, energy, and service costs.

(6) Some of the features available will allow you to save money. If the word "save" is printed above a figure, it means the feature will actually save you that much money. For example, if "save" is above the energy figure for a feature, then having that feature will save you that much money on your electricity bill.

(7) After you have completed building your refrigerator-freezer, please fill out the sheet labeled "HOW AND WHY ID DID IT MY WAY."

(8) Remember, this is your model that you will be building, and your family's wants, needs, and budget will probably be different from anyone else's. So, keep your model in the family, and please don't talk to your neighbors. If you have a question, raise your hand and I will answer it personally.

(9) Please take about 15 minutes to do this task.

HOW AND WHY I DID IT MY WAY

Briefly tell why you chose each feature or why you did not choose the feature.

(1) side -

(2) side by side -

(3) top freezer -

(4) color -

(5) frost free -

(6) adjustable shelves -

(7) automatic ice maker -

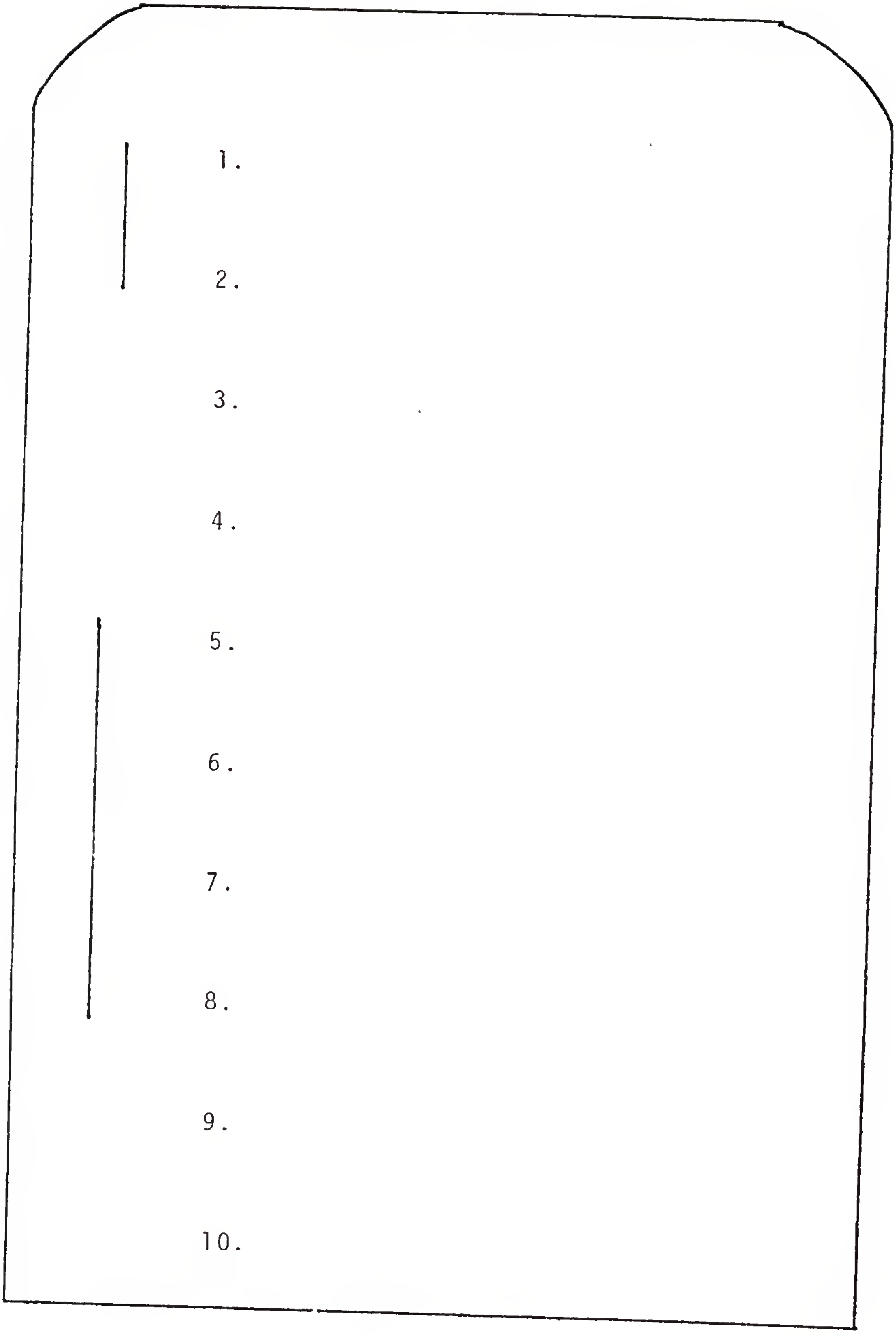
(8) ice and water dispenser -

(9) energy package -

(10)service contract -

(11)rollers -

Did you, after building a particular feature into your model, change your mind and choose a different alternative? Yes___: No ___: If yes, please tell what features you changed and why.


1.
2.
3.
4.
5.
6.
7.
8.
9.
10.

```
              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
14 CUBIC    $250  $ 480 $ 72  $ 80       16 CUBIC    $300  $ 590 $ 74  $ 914      17 CUBIC    $350  $ 670 $ 75  $1097
  FEET                                     FEET                                     FEET

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
19 CUBIC    $450  $ 830 $ 78  $135       22 CUBIC    $600  $1060 $ 80  $174       25 CUBIC    $750  $1300 $ 85  $213
  FEET                                     FEET                                     FEET

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
 SIDE BY    $150  $ 315 $ 25  $ 49         TOP         NO EXTRA COST
SIDE DOORS                               FREEZER

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
  COLOR     $ 10              $  1        COLOR        NO EXTRA COST
YELLOW,AVO-                               WHITE
CADO,ETC.

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
  FROST     $ 80  $ 470 $ 40  $ 59        MANUAL       NO EXTRA COST
  FREE                                   DEFROST

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
ADJUSTABLE  $ 10              $  1          NON        NO EXTRA COST
 SHELVES                                 ADJUSTABLE
                                          SHELVES

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
AUTOMATIC   $ 75  $ 110 $ 30  $ 21          NO         NO EXTRA COST
ICE MAKER                                AUTOMATIC
                                         ICE MAKER

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
 ICE AND    $120  $  50 $ 60  $ 23      NO ICE AND     NO EXTRA COST
  WATER                                   WATER
DISPENSER                               DISPENSER

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
  ENERGY          SAVE  SAVE  SAVE      NO ENERGY      NO EXTRA COST
 PACKAGE    $125  $ 250 $ 10  $ 13       PACKAGE

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
 SERVICE                SAVE                NO         NO EXTRA COST
 CONTRACT   $ 30        $ 30              SERVICE
2ND. YR.                                  CONTRACT

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
 MOUNTED    $  7              $           WITHOUT      NO EXTRA COST
   ON                                     ROLLERS
 ROLLERS

              PR    EN    SER   LCC                    PR    EN    SER   LCC                    PR    EN    SER   LCC
```

Number ____________

PART II

DO NOT TURN THIS PAGE
UNTIL YOU RECEIVE
FURTHER INSTRUCTIONS.

Below are a list of questions concerning the task you just completed. Please indicate your feelings by checking one of the seven numbered spaces below each question.

1. How certain are you that you made the best judgments concerning what features to include in the refrigerator-freezer and what not to include?

______	______	______	______	______	______	______
Very Uncertain	Uncertain	Somewhat Uncertain	Neither Certain Nor Uncertain	Somewhat Certain	Certain	Very Certain

2. How helpful did you find the cost information about the features in building your refrigerator-freezer?

______	______	______	______	______	______	______
Very Unhelpful	Unhelpful	Somewhat Unhelpful	Neither Helpful Nor Unhelpful	Somewhat Helpful	Helpful	Very Helpful

3. How complex did you find the cost information about the features?

______	______	______	______	______	______	______
Very Simple	Simple	Somewhat Simple	Neither Simple Nor Complex	Somewhat Complex	Complex	Very Complex

4. What other information, if any, would you have liked to receive while building your refrigerator-freezer?

STOP - DO NOT TURN THE PAGE.

Please give your evaluation of the following features which may be included on a refrigerator-freezer by checking one of the 5 spaces.

	LIKE THE FEATURE A GREAT DEAL--A MUST TO HAVE	VERY GOOD FEATURE	GOOD FEATURE	DON'T CARE IF I HAVE THE FEATURE OR NOT	DISLIKE THE FEATURE
(1) adjustable shelves	____	____	____	____	____
(2) automatic ice maker	____	____	____	____	____
(3) energy package	____	____	____	____	____
(4) frost free	____	____	____	____	____
(5) ice and water dispenser	____	____	____	____	____
(6) service contract	____	____	____	____	____
(7) side by side doors	____	____	____	____	____
(8) 16 cubic foot size	____	____	____	____	____
(9) 19 cubic foot size	____	____	____	____	____
(10) 22 cubic foot size	____	____	____	____	____

STOP - DO NOT TURN THE PAGE.

Refrigerator-Freezer Cost

Many people think that when consumers set out to buy a product, they should look at the product's total cost. For example, when a consumer decides to buy a car, the purchase price is usually important. But, there are other important costs he must think about as well, such as how much gas it uses, yearly car taxes, the cost to replace parts, general upkeep, etc. Some people feel this same kind of total cost approach should be taken by consumers in buying a refrigerator-freezer. We are interested in how you feel about the costs of refrigerator-freezers.

(1) There seem to be two kinds of costs for products such as refrigerator-freezers. One is the cost to the consumer to own it. This type would include the purchase price. The other type involves the money you have to spend to operate the product, such as buying gasoline in the case of cars. These are called operating costs.

(a) How much do you think it costs a consumer to own an average refrigerator-freezer? ________
(b) How many years do you believe the average refrigerator-freezer lasts before it wears out? That is, what is its useful life span?____________
(c) How much do you think it would cost the consumer to operate a refrigerator-freezer over its useful life? ____________

(2) The main factors involved in the operation of a car are cost of gas, replacement of parts, etc. What do you believe are the main factors involved in the cost of operating a refrigerator-freezer?

(3) In the space below, please list the factors you gave in number (2) in order of their contribution to the total operating cost of a refrigerator-freezer. The one that costs the most should be listed first, the second most costly factor should be listed second, and so on.

STOP - DO NOT CONTINUE.

In the next few pages, we are interested in seeing how important some of the information about the features was to you. We did not ask you to learn all the information about every feature, and even if you do not recall the exact numbers, we are interested in your ideas about the various costs associated with the features.

Under the heading FEATURES, you can see a number of features that may be included in a refrigerator-freezer (adjustable shelves, automatic ice maker, etc.). Under the heading LIFE CYCLE COST, you can see a number of ranges of dollar figures ($200-$100 saved, $1-$25, etc.). For each feature, tell us how much you believe it costs or saves over the life of the feature (assume a 14 year life) by placing the number of the feature after the most likely range. Notice, (a) and (b) represent savings while the rest of the ranges are cost figures. Only one feature number goes to a space. After you have matched each feature with a cost range, tell us how confident you are that your answers are correct by checking one of the seven numbered spaces on the scale below. Also, indicate your answer to the last question on this page by placing a check in the box beside the factor you feel is the highest.

FEATURE NUMBER		LIFE CYCLE COST (Price + Energy + Service)	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a) $200 - $100 saved	____
2.	Automatic ice maker	(b) 99 - 0 saved	____
3.	Frost free	(c) 1 - 125	____
4.	Ice and water dispenser	(d) 126 - 225	____
5.	Side by side doors	(e) 226 - 325	____
6.	Energy package	(f) 326 - 425	____
		(g) 426 - 525	____
		(h) 526 - 625	____
		(i) 626 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

Over the life of a refrigerator-freezer, which would you expect to be more:

Electricity cost ☐ or Purchase price ☐

CONTINUE ON TO THE NEXT PAGE

Please tell us how much you believe the lifetime electricity cost is for each feature by matching a feature number with a cost range. Assume a 14 year life for the features.

FEATURE NUMBER	FEATURE	LIFETIME ENERGY COST	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a) $300 - $200 saved	____
2.	Automatic ice maker	(b) 199 - 100 saved	____
3.	Frost free	(c) 99 - 0 saved	____
4.	Ice & water dispenser	(d) 1 - 50	____
5.	Side by side doors	(e) 51 - 100	____
6.	Energy package	(f) 101 - 200	____
		(g) 201 - 300	____
		(h) 301 - 400	____
		(i) 401 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

---

Please tell us how much you believe the price of each feature is.

FEATURE NUMBER	FEATURE	PRICE	PUT FEATURE NUMBER HERE
1.	Adustable shelves	(a) $ 0 - $ 25	____
2.	Automatic ice maker	(b) 26 - 50	____
3.	Frost free	(c) 51 - 75	____
4.	Ice & water dispenser	(d) 76 - 100	____
5.	Side by side doors	(e) 101 - 120	____
6.	Energy package	(f) 121 - 140	____
		(g) 141 - 160	____
		(h) 161 - 180	____
		(i) 181 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

CONTINUE TO THE NEXT PAGE

We have been talking about the costs of the features in terms of their life cycle costs. Now we would like you to think in terms of yearly costs. Please give your best estimate of the yearly electricity cost for each feature.

FEATURE NUMBER	FEATURE	YEARLY ELECTRICITY COST	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a) \$20 - \$15 saved	____
2.	Automatic ice maker	(b) 14 - 10 saved	____
3.	Frost free	(c) 9 - 0 saved	____
4.	Ice & water dispenser	(d) 1 - 5	____
5.	Side by side doors	(e) 6 - 10	____
6.	Energy package	(f) 11 - 20	____
		(g) 21 - 31	____
		(h) 31 - 40	____
		(i) 41 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

STOP - DO NOT CONTINUE

What Is The Cost of a Refrigerator-Freezer?

Sometimes when a consumer decides to buy a refrigerator-freezer he goes to his neighbors for advice. Pretend that your neighbor is trying to decide between two refrigerator-freezers, and he comes to you for some advice. The "Exclusive" model is frost free, has a purchase price of $475, all of the standard features, and costs $45 a year in electricity to run. He also likes the "Top Flight" model. This model has a purchase price of $525. It is also frost free, and the standard features are about the same. It will cost $39 a year in electricity to run this model.

Your neighbor plans to keep whichever model he buys until it wears out. The appliance dealer has told him that both models should last 14 years. Your friend wants to buy the one that will cost him the least over its life.

First, he asks you which model--the "Exclusive" or the "Top Flight"--will cost him the least over its life. What would you tell him?

After you have given him an answer to the first question, he is still confused so he asks you, "How much will I save by buying the model you suggest?" How much would you tell him?

STOP - DO NOT CONTINUE.

Please answer the following general information questions.

1. How long has it been since your household purchased a refrigerator-freezer?

______:	______:	______:	______:	______:	______:	______:
0-1 years	2-4	5-7	8-10	11-13	14-16	17 or more years

2. How long has it been since you purchased any other major appliance (a major appliance is defined as one that cost more than $100)?

______:	______:	______:	______:	______:	______:	______:
0-1 years	2-4	5-7	8-10	11-13	14-16	17 or more years

3. Approximately how long before you purchase your next refrigerator-freezer?

______:	______:	______:	______:	______:	______:	______:
0-1 years	2-4	5-7	8-10	11-13	14-16	17 or more years

4. Approximately how long before you purchase your next major appliance other than a refrigerator-freezer?

______:	______:	______:	______:	______:	______:	______:
0-1 years	2-4	5-7	8-10	11-13	14-16	17 or more years

5. When shopping for major appliances, what sources of information do you make use of?

6. When you shop for a major appliance, do you shop around?

______:	______:	______:	______:	______:	______:	______:
extensively	much more than the average person	slightly more	average	slightly less than average	much less	none

7. Age: 18-22 __:23-28 __: 29-33 __:34-38 __:39-44 __:45-55 __:55-65__:66__:

8. Sex: __________

9. The last year of school I completed was: (Please circle the last year completed)

1 2 3 4 5 6 7 8 9 10 11 12 — Grade School

1 2 3 4 — College

CONTINUE ON TO THE NEXT PAGE

10. Earnings of household, after taxes, in 1975:

_____:	_____:	_____:	_____:	_____:
0-$4999	$5,000- $9,999	$10,000- $14,999	$15,000- $19,999	$20,000- above

11. What is your occupation? ____________________________

12. Marital Status: Married _____ Single _____ Widowed _____

Divorced _____ Legally Separated _____

13. If married, spouse's occupation ____________________________

14. Do you have children? Yes _____ No _____

15. If yes, how many? ____________________________

16. Some people have proposed that various kinds of energy information be made available to the consumer when he is comparing refrigerator-freezers. Which of the following would you find MOST helpful?

☐ A cost per year figure (Example: $67.50 per year).

or

☐ The total lifetime electricity cost to run that refrigerator-freezer (Example: $945 total energy cost).

or

☐ I find neither of the above to be very helpful.

ENERGY/YEAR CONDITION CHANGES

DESCRIPTIONS OF FEATURES:

[a]The AUTOMATIC ICE MAKER freezes the cubes and releases them into the server automatically, so there is no more fumbling with ice trays.

[b]ENERGY PACKAGE contains a number of new features and design changes, such as power saving switch and more efficient motor, which will reduce electricity use.

[c]The FROST FREE feature keeps the model completely free of frost in both the freezer and refrigerator. No defrosting of any kind is ever needed.

[d]PRICE is equal to the manufacturer's suggested retail price.

[e]ENERGY cost per year is how much the consumer pays to run his refrigerator-freezer each year. The range represents electricity costs for all similar models of refrigerator-freezers.

REFRIGERATOR-FREEZER MODELS CHART

MODELS

(assume that each model would be available in the size and color that you prefer and with any standard features)

FEATURES		Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	[a]Automatic Ice Maker	Not In This Model	Not In This Model	Not In This Model	Included In This Model	Not In This Model	Included In This Model
	[b]Energy Price	Not In This Model	Not In This Model	Included In This Model	Not In This Model	Included In This Model	Included In This Model
	[c]Frost Free	Not In This Model	Included In This Model	Not In This Model	Included In This Model	Included In This Model	Included In This Model
	[d]Price	$350	$430	$475	$505	$555	$630
	[e]Energy Cost Per Year	Cost/year $48 Range $36-90	Cost/year $82 Range $36-90	Cost/year $36 Range $36-90	Cost/year $90 Range $36-90	Cost/year $52 Range $36-90	Cost/year $54 Range $36-90

(5) The cost information on the tabs may be explained as follows:

Pr = price.	This is the manufacturer's suggested retail price.
E/yr = energy cost per year.	It is the electricity cost to run that feature each year.
Range = range of energy costs.	This represents the range of costs for similar features in all models of refrigerator-freezers.

(6) Some of the features available will allow you to save money. If the word "save" is printed above a figure, it means the feature will actually save you that much money. For example, if "save" is above the energy figure for a feature, then having that feature will save you that much money on your electricity bill.

(7) After you have completed building your refrigerator-freezer, please fill out the sheet labeled "HOW AND WHY I DID IT MY WAY."

(8) Remember, this is *your* model that you will be building, and your family's wants, needs, and budget will probably be different from anyone else's. So, keep your model in the family, and please don't talk to your neighbors. If you have a question, raise your hand and I will answer it personally.

(9) Please take about 15 minutes to do this task.

	PR	EN	SER	LCC		PR	EN	SER	LCC		PR	EN	SER	LCC
14 CUBIC FEET	$250	$ 480	$ 72	$ 802	16 CUBIC FEET	$300	$ 590	$ 74	$ 914	17 CUBIC FEET	$350	$ 670	$ 75	$1097
19 CUBIC FEET	$450	$ 830	$ 78	$1358	22 CUBIC FEET	$600	$1060	$ 80	$1740	25 CUBIC FEET	$750	$1300	$ 85	$2135
SIDE BY SIDE DOORS	$150	$ 315	$ 25	$ 490	TOP FREEZER	NO EXTRA COST								
COLOR YELLOW.AVOCADO.ETC.	$ 10			$ 10	COLOR WHITE	NO EXTRA COST								
FROST FREE	$ 80	$ 470	$ 40	$ 590	MANUAL DEFROST	NO EXTRA COST								
ADJUSTABLE SHELVES	$ 10			$ 10	NON ADJUSTABLE SHELVES	NO EXTRA COST								
AUTOMATIC ICE MAKER	$ 75	$ 110	$ 30	$ 215	NO AUTOMATIC ICE MAKER	NO EXTRA COST								
ICE AND WATER DISPENSER	$120	$ 50	$ 60	$ 230	NO ICE AND WATER DISPENSER	NO EXTRA COST								
ENERGY PACKAGE	$125	SAVE $ 250	SAVE $ 10	SAVE $ 135	NO ENERGY PACKAGE	NO EXTRA COST								
SERVICE CONTRACT 2ND. YR.	$ 30		SAVE $ 30		NO SERVICE CONTRACT	NO EXTRA COST								
MOUNTED ON ROLLERS	$ 7			$	WITHOUT ROLLERS	NO EXTRA COST								

In the next few pages, we are interested in seeing how important some of the information about the features was to you. We did not ask you to learn all the information about every feature, and even if you do not recall the exact numbers, we are interested in your ideas about the various costs associated with the features.

Under the heading FEATURES, you can see a number of features that may be included in a refrigerator-freezer (adjustable shelves, automatic ice maker, etc.). For each feature, tell us what you believe its price is by placing the number of the feature after the most likely price range. After you have matched each feature with a price range, tell us how confident you are that your answers are correct by checking one of the seven numbered spaces on the scale below. Also, indicate your answer to the last question on this page by placing a check in the box beside the factor you feel is highest.

FEATURE NUMBER	FEATURE	PRICE	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a) $ 0 - $ 25	____
2.	Automatic ice maker	(b) 26 - 50	____
3.	Frost free	(c) 51 - 75	____
4.	Ice & water dispenser	(d) 76 - 100	____
5.	Side by side doors	(e) 101 - 120	____
6.	Energy package	(f) 121 - 140	____
		(g) 141 - 160	____
		(h) 161 - 180	____
		(i) 181 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

Over the life of a refrigerator-freezer, which would you expect to be more?

Electricity cost ☐ or Purchase price ☐

CONTINUE ON TO THE NEXT PAGE.

Please tell us how much you believe the yearly electricity cost is for each feature by matching a feature number with a cost range.

FEATURE NUMBER	FEATURE	ENERGY COST PER YEAR	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a) $20 - $15 saved	____
2.	Automatic ice maker	(b) 14 - 10 saved	____
3.	Frost free	(c) 9 - 0 saved	____
4.	Ice & water dispenser	(d) 1 - 5	____
5.	Side by side doors	(e) 6 - 10	____
6.	Energy package	(f) 11 - 20	____
		(g) 21 - 30	____
		(h) 31 - 40	____
		(i) 41 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

CONTINUE ON TO THE NEXT PAGE

Please give us your best estimate of what the total electricity cost is over the life of the feature by matching a feature number with a cost range. Assume a 14 year life for the features.

FEATURE NUMBER	FEATURE		ENERGY COST	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a)	$300 - $200 saved	____
2.	Automatic ice maker	(b)	199 - 100 saved	____
3.	Frost free	(c)	99 - 0 saved	____
4.	Ice & water dispenser	(d)	1 - 50	____
5.	Side by side doors	(e)	51 - 100	____
6.	Energy package	(f)	101 - 200	____
		(g)	201 - 300	____
		(h)	301 - 400	____
		(i)	401 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

---

Please give us your best estimates of what the TOTAL COST of owning and using each feature is by placing the number of the feature after the most likely range. Notice, (a) and (b) represent savings while the rest of the ranges are cost figure. Assume a 14 year life for the features.

FEATURE NUMBER	FEATURE		TOTAL COST	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a)	$200 - $100 saved	____
2.	Automatic ice maker	(b)	99 - 0 saved	____
3.	Frost free	(c)	1 - 125	____
4.	Ice & water dispenser	(d)	126 - 225	____
5.	Side by side doors	(e)	226 - 325	____
6.	Energy package	(f)	326 - 425	____
		(g)	426 - 525	____
		(h)	526 - 625	____
		(i)	626 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

STOP - DO NOT CONTINUE

CONTROL CONDITION CHANGES

DESCRIPTION OF FEATURES:

[a]The AUTOMATIC ICE MAKER freezes the cubes and releases them into the server automatically, so there is no more fumbling with ice trays.

[b]The ENERGY PACKAGE contains a number of new features and design changes, such as a power saving switch and more efficient motor, which will reduce electricity use.

[c]The FROST FREE feature keeps the model completely free of frost in both the freezer and refrigerator. No defrosting of any kind is ever needed.

[d]PRICE is equal to the manufacturer's suggested retail price.

REFRIGERATOR-FREEZER MODELS CHART

MODELS

(assume that each model would be available in the size and color that you prefer and with any standard features)

FEATURES	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
[a]Automatic Ice Maker	Not In This Model	Not In This Model	Not In This Model	Included In This Model	Not In This Model	Included In This Model
[b]Energy Package	Not In This Model	Not In This Model	Included In This Model	Not In This Model	Included In This Model	Included In This Model
[c]Frost Free	Not In This Model	Included In This Model	Not In This Model	Included In This Model	Included In This Model	Included In This Model
[d]Price	$350	$430	$473	$505	$555	$630

(5) The cost information on the tabs may be explained as follows:

Pr = price. This is the manufacturer's suggested retail price.

(6) After you have completed building your refrigerator-freezer, please fill out the sheet labeled "HOW AND WHY I DID IT MY WAY."

(7) Remember, this is your model that you will be building, and your family's wants, needs, and budget will probably be different from anyone elses. So, keep your model in the family, and please don't talk to your neighbors. If you have a question, raise your hand and I will answer it personally.

(8) Please take about 15 minutes to do this task.

14 cubic feet	PR $250	16 cubic feet	PR $300	17 cubic feet	PR $350
19 cubic feet	PR $450	22 cubic feet	PR $600	25 cubic feet	PR $750
side by side doors	$150	top freezer	PR No extra cost		
color yellow, avocado, etc.	PR $ 10	color white	PR No extra cost		
frost free	PR $ 80	manual defrost	PR No extra cost		
adjustable shelves	PR $ 10	nonadjustable shelves	PR No extra cost		
automatic ice maker	PR $ 75	no automatic ice maker	PR No extra cost		
ice and water dispenser	PR $120	no ice and water dispenser	PR No extra cost		
energy package	PR $125	no energy package	PR No extra cost		
service contract 2nd yr.	PR $ 30	no service contract	PR No extra cost		
mounted on rollers	PR $ 7	without rollers	PR No extra cost		

In the next few pages, we are interested in seeing how important some of the information about the features was to you. We did not ask you to learn all the information about every feature, and even if you do not recall the exact numbers, we are interested in your ideas about the various costs associated with the features.

Under the heading FEATURES, you can see a number of features that may be included in a refrigerator-freezer (adjustable shelves, automatic ice maker, etc.). For each feature, tell us what you believe its price is by placing the number of the feature after the most likely price range. After you have matched each feature with a price range, tell us how confident you are that your answers are correct by checking one of the seven numbered spaces on the scale below. Also, indicate your answer to the last question on this page by placing a check in the box beside the factor you feel is highest.

FEATURE NUMBER	FEATURE	PRICE	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a) \$ 0 - \$ 25	____
2.	Automatic ice maker	(b) 26 - 50	____
3.	Frost free	(c) 51 - 75	____
4.	Ice & water dispenser	(d) 76 - 100	____
		(e) 101 - 120	____
		(f) 121 - 140	____
		(g) 141 - 160	____
		(h) 161 - 180	____
		(i) 181 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

Over the life of a refrigerator-freezer, which would you expect to be more?

Electricity cost ☐ or Purchase price ☐

CONTINUE ON TO THE NEXT PAGE.

Please give us your best estimates of what the TOTAL COST of owning and using each feature is by placing the number of the feature after the most likely range. Notice, (a) and (b) represent savings while the rest of the ranges are cost figures. Assume a 14 year life for the features.

FEATURE NUMBER	FEATURE	TOTAL COST	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a) $200 - $100 saved	______
2.	Automatic ice maker	(b) 99 - 0 saved	______
3.	Frost free	(c) 1 - 125	______
4.	Ice & water dispenser	(d) 126 - 225	______
5.	Side by side doors	(e) 226 - 325	______
6.	Energy package	(f) 326 - 425	______
		(g) 426 - 525	______
		(h) 526 - 625	______
		(i) 626 - greater	______

How sure are you that the answers you just gave are correct?

______	______	______	______	______	______	______
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

CONTINUE ON TO THE NEXT PAGE

Some features have to use electricity to run. Please give your best estimate of what the energy costs are for the features by matching a feature number with the cost range. Assume a 14 year life for the features.

FEATURE NUMBER	FEATURE		YEARLY ELECTRICITY COST	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a)	\$20 - \$15 saved	____
2.	Automatic ice maker	(b)	14 - 10 saved	____
3.	Frost free	(c)	9 - 0 saved	____
4.	Ice & water dispenser	(d)	1 - 5	____
5.	Side by side doors	(e)	6 - 10	____
6.	Energy package	(f)	11 - 20	____
		(g)	21 - 30	____
		(h)	31 - 40	____
		(i)	41 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

---

In the first half of this page, you gave your best estimates concerning yearly electricity costs. Now, we would like you to give your best estimates for the lifetime energy costs of the features. Assume a 14 year life span for the features.

FEATURE NUMBER	FEATURE		ENERGY COST	PUT FEATURE NUMBER HERE
1.	Adjustable shelves	(a)	\$300 - \$200 saved	____
2.	Automatic ice maker	(b)	199 - 100 saved	____
3.	Frost free	(c)	99 - 0 saved	____
4.	Ice & water dispenser	(d)	1 - 50	____
5.	Side by side doors	(e)	51 - 100	____
6.	Energy package	(f)	101 - 200	____
		(g)	201 - 300	____
		(h)	301 - 400	____
		(i)	401 - greater	____

How sure are you that the answers you just gave are correct?

____	____	____	____	____	____	____
Very Sure	Sure	Slightly Sure	Neither Sure Nor Unsure	Slightly Unsure	Unsure	Very Unsure

STOP - DO NOT CONTINUE

APPENDIX IV

COST CALCULATIONS

MODEL EVALUATION

1. There are 8 possible combinations of characteristics, but 2 are not realistic since an automatic ice maker only comes with frost free.

2. Model Price - based on survey of leading appliance dealers in the Gainesville area. Suggested retail price was used for the Model. In some cases estimates had to be made since a model which exactly fit the description could not be found.

3. Feature Price
   a. Frost free - $80 based on dealer estimates and survey of Association of Home Appliance Manufacturers 1976 Directory of Certified refrigerator-freezers (AHAM).

   b. Automatic ice maker - $75 based on appliance dealer estimates ($50 cost + $25 installation).

   c. Energy package
      (1) power switch - no additional cost according to dealers
      (2) insulation - $14 (MIT)
      (3) polyphase motor - $20 (MIT)
      (4-5) tubing and increased surface - $75 upper limit (MIT) n.b., I chose price = $125 to account for possible price increases from the switch.

4. Energy
   a. Manual
      AHAM Range for 14.5-17.5 cu. ft. = $2.20-$3.20/mo. @ 4¢/kWh
      $.04x = 3.20$ (17 @ maximum end)
      $x = 80$ kWh x 5¢ (Gainesville rate) = $4.00

   b. Automatic Frost Free
      AHAM Range = $3.50-$8.30/mo. @ 4¢
      $.04x = 8.30$
      $x = 208$ kWh x 5¢ = $10.40
      Range of kWh = 88-208
      Based on survey of AHAM and dealer survey average kWh use is 140 which is in upper half of range
      Consequently estimated energy cost of frost free = $2.80
      Frost free increases bill approximately 70%

c. Automatic Ice Maker
Based on dealer survey and AHAM, cost ≈ \$.66/mo.

d. Energy Package
(1) Power switch saves ≈ \$1/mo. according to dealer survey
(2) Insulation ≈ \$1.09/mo (MIT)
(3) Motor ≈ \$.66/mo. (MIT, but varies by size)
(4) Tubing ≈ \$.72/mo. (MIT)
(5) Surface area ≈ \$.89/mo. (MIT)
n.b., total savings amount to \$4.35/mo. which is greater than the cost of sum model's bill. In order to make it more realistic this figure was prorated to arrive @ model energy cost.

e. Model Cost
M1 = \$4 x 12 mo. x 14 year
M2 = \$4 + \$2.80 x 12 x 14
M3 = 4 - (1/4 x 4) x 12 x 14 n.b., prorated energy saving = 1/4
M4 = 6.80 + .66 x 12 x 14
M5 = 6.80 - (3/8 x 6.80) n.b., prorated energy saving = 3/8
M6 = 7.46 - (7/16 x 7.46) n.b., prorated energy saving = 7/16

5. Service
Costs had to be approximated. Used the industry average supplied by MIT Report of 6% of total cost

BUILDING TASK

1. Size
a. Price - based on dealer survey
b. Energy
(1) Estimated from AHAM
(2) 17 cubic feet - \$.25/cu.ft.
(3) 20 cubic feet - \$4.80 (AHAM) = 120 kWh x .05 = \$6 =>
6 ÷ 20 = \$.30/cu.ft.
.5 x 12 x 14 = \$50
(4) 22 cubic feet - \$5.50 = 138 kWh x .05 = \$6.90
6.9 ÷ 22 = \$.31/cu.ft.
.31 x 12 x 14 = \$52
(5) 25 cubic feet - \$8 = 200 kWh x .05 = \$10 =>10 ÷ 25 = \$.40/cu.ft.
.4 x 12 x 14 = \$70

2. Door Location
    a. Price - based on dealer survey and AHAM
    b. Energy - based on dealer survey and AHAM

3. Color - dealer survey

4. Frost free, automatic ice maker, energy package - same as models

5. Adjustable shelves, ice and water dispenser, and wheels - based on dealer survey and brochures

6. Energy Package
    a. Price - same as for models
    b. Energy - since this represents negative cost and because it varies by model, I said it would reduce cost by 1/4. This is just an estimate.

7. Warranty - no data on this, therefore a personal estimate.

8. Service contract - also a personal estimate.

APPENDIX V

RAW DATA AND CODING SHEET

```
1011 47399312213333553773344551774211222121177411152112353 85014 600035467151 72
1012 4576315171532465172685715172143334421331112141
1013 10 7125455541165525011451254455
1021 3331521111222355563232453177421112212116634444522224 50012 900357861511 72
1022 4786615171673315174692715172131434321341115121
1023 10 712553545615555595524552445 55
1031 453172121172137276153564177321111212115724455132531 600151000356041551 1
1032 3590413511365555171407415172141327421641115124
1033 99 7125555155155555555524521545 5
1041 2461971111212344672234451775211111211164343422113318001520003162451371
1042 3712591172634551347235513714272274215511 2134
1043 10 3551655655455555555552155455
1051 175 621221232131576147354177422112212117725355212144 500179999348571 6171
1052 4406617171345876717459761517217161722123118111
1053 99 0123655655565572446442152 55
1061 545243121122235357714230517741112211166352554341 54 40014 750354261 2171
1062 356271257172446217356471237095212462124112141
1063 4 712755555555555246494245154
1071 3431511191441232724229951771211112111167245555141144 50699999900000009465
1072 3264512517246365513354421274991244662124918151
1073 4 7125555555555555524555524 354
1081 5411411211232425552717233517722111222111625325221522 6001399992435482171
1082 6759792173944297217397999217215522762 93112122
1083 6 69975554664655555555566554 55
1091 37329219110995541715444531775221121111167251453313459999169999283764177 1
1092 0056401600304591540000000046141111652123339123
1093 99 69500465555555555555555099975 9
1101 775102172122213267123245177311112211117715255255351 85915 6002345415171
1102 46872151322568755175972151721721137213274913 1
1103 6 71255555555555555555445524 354
1111 3749931211222746127543234177221111211113724444444499 7001399999000001469
1112 000000146000000014600000024699339998210911810 9
1113 79000095555555556009999949999999 7
1121 6459912221205900609000096405541221221211664341311149 42 40016 40020000026 52
1122 56000016507545311735795531170542092721427391 23
1123 8 25455555555555655566556 55255
1131 45416222322225555871353451772211111111119995445441333150614160004504722529
1132 000006994000000969060071614399 49991299990001 11
1133 0000000465575557555555545555 245154
141 15415212221517221722313517721111111121999502542551 19999999999024560033520
142 00000000000000000966436561452099999999220999991 33
143 0015599595555555555555600997999990
151 14150127214592  1455672 0  43 177311112211 19995445453430999917406545456724510
152 0000007466000000 9  1409906295 20911111012999919122
153 09990 945  46  450046 09 4 4999
161 37410212122332467 64541 3001772222122221119955222222929 39699999900406546 3
162 000020 460000000 440066  14530014999220999941 41
163 20009991554555 1 5 4 4045  55 94907
171 345221112111211255527124465517741111111211176755 55515995 47511 4003334605371
172 0574 145113554551744745 1574431753672155112101
173 90 655122555575555 5545 54 5 455
181 47042911  3212162 37 2 143 5177412111122111665535254251 42 60014 60034445 13171
182 6777451172 4 67113467 4 1 21412 5214571 2 21
183 99 7125 454555 5 5555 55 55 5 545
191 2431522251122 1 274 1 1 1 4 4 7732111122121 16724305322433 60013 40033394 1 5 71
```

```
1192 068601532136437537077601532142201432164512121
1193 99 7125655755755555155155245855
1201 2331613221222162579142354117422112212117625155114051 45010 7003465015511
1202 328651537124435517378561537232232532164115121
1203 9910132655755555555411411245855
1211 24315111111111153567122205177211111121165555043532532215001518003672814171
1212 50987141115864079417459761517212263472165113111
1213  6 5551555555555555555555245355
1221 37417721221222151667122245177021112121166150445222154 5001210003344514171
1222 377761217168867317365671217213112742165112121
1223 99 721555615555555655466245355
1231 2731621211222131374132354177421112212117645235121959 40017 7003574514171
1232 3687714372409769417346558437252262732169115131
1233  5 1155555855755555855466245855
1241 5431821211222365271343251177421112212117715125121151 5001510003545412171
1242 367561217133345217356671217215133732165115151
1243 10 7125655466466655466466245855
1251 1631721111231133567333205177421111212116755455213143 7001515003440455171
1252 398871212157779117387641117211133422164214201
1253 1010123655866755555555855245855
1261 24114222122221552777224151177421112212117715145121142 5251014003546313171
1262 376851317148936517466952317211112712162114201
1263  91023165506466555066466245855
1271 231999121123255265713240517742111111111765504540233210351422403445514171
1272 000941154145651417487941217225433742163229203
1273  2 7999455755755555555555245354
1281 454963121123236736722524517722211211111553535405314221000199993260505321
1282 307081557112090532307091552221322442154112121
1283  6 5365455215855225555555245354
1291 3641651221222225253113245177322111212115623355221342 85013 4503444314172
1292 445562517134456517458602417213231642163112114
1293  9 7125655755655555411351245455
1301 24316222312224653753400540177321112212115605255424333 5752025003685414171
1302 389762317134570317389561317222263632164515204
1303  9101235554665466555406466245355
1381 2321431211231153567132405177311111211116535405140222 20010 5003444415172
1382 4667415171347726517477841517232211642155415111
1383 10 7125755855099555555585520354
1391 2662031111199111257112235177521111211116740545332133 65010140035405121 71
1392 356432137166776117489761137222252662115115121
1393  41012355546656655555466204354
1401 1469831222222533276323275177412112211116640235234909 9001690993758415171
1402 487935131715841511356934517219194722162449111
1403  6 3551655555399555466046215354
2011 22525112421211313277213255177612112212117725155214105 40014 7003452003521
2012 476351337165823317476231337232152702165212121
2013 10 712575575555555565755204555
2021 2651911111122133557314225177521111212117425355322345 60013 9003675415172
2022 379451517142536517967354517212244442105112101
2023  9 721565585586555545555525855
2031 266202111191113336471222405177511111111116525555235110 60010 7502057813172
2032 356761317125575517348751317222134432165112121
2033  5 7125755455555555555555245354
2041 336193111123111356472222235177421112112150455558231162 50020 3002350311172
2042 3356321127764572017376577217213167032124112133
2043 10 6112655715755555555665205354
```

```
2051 27214212122225132671234351772111112122175155353254221002010002543612171
2052 365271417160759517354261417142277722162149201
2053 10 7125755655555555555466245355_
2061 3631811121211115165714145177411111211215614355445151 60010 7003756415171
2062 4586315371368576173674516572132225621641112131
2063 10 71256555559995555559555245354_
2071 363 53129122225325723214517732211121111672545523124299991054002536410171
2072 32345153714602755136594437213622762123912182
2073  8 145555555755555245855245354_
2081 7749931939942279099999999999563121111211316144343549999999209999000000 9469
2082 0000009700000009260000000976997999282992139909
2083 999999925555509955509999999990466_
2091 17622212112211610771424541775111112211177152355551259999 899993678541372
2092 431765137360784137000000746993322462125118181
2093  8 59095555550975555555555909354_
2101 453 9222112224571223451111773212122121167132553122499 4001099992867415171
2102 398961517193675517399951517214232472134112141
2103  8 71256559995552159999999245999_
2111 5439931111221151227142225177112111111117515555555511 5501099990000001462
2112 000000146234567327000000146095521172165118102
2113 10 2545755555855555555555245354_
2121 141 62122222256556742343517721111111119999044444342 50020 1000020315539
2122 0030425531200029830000000946991171942999999121
2123 9999979999555099955555555245999_
2131 1820937229222225667640534391772121111211199944249944999999999999990000009469
2132 0070029540000000946007052253999999429999999119
2133 9600000945590099955555590000009909_
2141 191993222292277567713494737161111111119995555555115 900 599995764995279
2142 00000096600000094600060795532999949912129999111
2143 5999999555555099955555546245999_
2151 1441873212122433566713314517731111121111999644443343 01 30015 7000030511539
2152 000000994600000000940060811539912396121199990121
2153 9999999557559999995559009245999_
2161 2331711211222171665153422177321112222117745225431441 4501513602473212171
2162 369532217179586517358432217142299752165529201
2163 10 7125555755555555966855115955_
2171 3552211211211115135561324651775111112121145454045123134 60015 6002565411171
2172 478741217135257317346731217223143542164115121
2173  5 7125755557555555556655245655_
2181 37316211212221315571224351774211112222175445251221 02 4001018000000011551
2182 399967337106656217329851337233132032165559121
2183  51012355555515555555555415355_
2191 44519211112222373563224451774121112121 6723555213151160023 3003655312172
2192 477641217159285217647651217224044462145715111
2193  0 71256575555555555555551245355_
2201 4331922212222245367212145177411111211116635235203131 75012 3603000009552
2202 385721417122784517348521517293521542150059136
2203  8 82136555555555555555655245354_
2211 135201121122224245123554177421112222117504450442222255 02511 3002575814172
2212 378461417142446017359791917231252742155115121
2213  5 71256557555665556451651245355_
2221 39619311111132222226213255177422111212113623545212939 6001010003898513171
2222 48974131736762621735984131725714632164512111
2223  2 71257455556555656555565009155_
2231 41684211112815225571224251761111112117613540043224 7001010003076414171
```

```
2232 389651417174336517367051517234139552155412151
2233  9 7125999999999999999909999999999_
2241 2841531212222450766443534177422122221215135535255544 600 81920234015604371
2242 342162417642578537451262417191232522132114111
2243 10 7125655155155555555855855354_
2251 244152221222222765142455177321112211117644155332342 5001410002566512171
2252 378771317198999317367551217222212722144518201
2253  410123155155155555351555245354_
2261 2441821111212121347122445177321111212117725445222450 00015 6004565514171
2262 467661417254346417457651417222151442144115131
2263 10 71256557555555555555155245855_
2271 543181121122211116712224517731111112116413455425432 35014 8003575411171
2272 379761117134127117379631117215422532165349121
2273 10 7125655655997555555655245855_
2291 26619211211221215271214251774211111111116325555541140 50015100047863111171
2292 578641117132548517469751117232251742145118132
2293  9101234557556555555555655245354_
2301 184991222222266733244522117732222212115722144122431 40015 6003657413171
2302 455851517114533651737893151723712942216141420 1
2303  4 7125655466466555415415245855_
2311 2521721222222536555325134177121212212217615453121311 40015 4503897315171
2312 389731517145336517379631517227777622162529204
2313  2 7125655555555215215215245855_
3011 3431712221222255657133435177412111212115644535324143 400159999342342617 2
3012 343442217164574517343443517223234321651121 32
3013  4 71254665551555555554662453 54_
3021 36316211112111122657122435177412111222116524525224342 50015 1252036152372
3022 000000946132675537375859437223241742135118121
3023 95 74554555555555555555655255355_
3031 24619211111311132657132445177511111111116724555435334 50013 1503320714172
3032 000000946124753517432751517142352432143113131
3033  5 71254555559975555555555245354_
3041 714 331999744925957413934317711211221211642435225242 55013 2500415002632
3042 682907232165734417396761231297349072129739999
3043 99 4554655755995555151555245355_
3051 2252421111113113250712235417751211112116626335413245 70015999923415621 79
3052 300467962135462217346579217292261752123118143
3053 10 5554655555755555555655245355_
3061 14317219919192333761333541773221111211262524521101120001515003450621511
3062 000000946134576217306082153141369377214511511 1
3063 99 1455465575545555555565524535 5_
3071 363161121121145472625534332773111121121126352555525252  6010  602211445172
3072 255721537346573617118087553122365947216211820 3
3073  9 55546555555995555555555245855_
3081 3639939912222317774215534177221122212116233355322333999910 2400000009461
3082 315769517273946517413976517157749682 91839169
3083  4 14554550995555500940025999
3091 24114112122228999969999985455221111211117635555251511 55010 2700230569221
3092 000000984125553217000000099614959957299999999
3093  99999575575555555555558555245358
3101 4669931111222459647122345177611111211117625555231341100615 7003450002532
3102 421009632263499617307999533224201752126 18121
3103 10 7999655765555555555565524535 0
3111 574 5311212228635572534451773221112121154655355213321 6501599993126423171
3112 000000965145766217352002539951340274999999999
3113 10999998556666655555555555245855
```

```
3121 37499912222322526421315341773211122222119994235223511 4451899990030064549
3122 0000009460000000946003068453993399752999999129
3123 9999999655855555558558559999999
3131 495999199999915555724444517741211221111999425424455999991499990030565239
3132 0030569230000000946003056923999999952999812141
3133 9999999555555999555999999245354
3141 69116999999961657351435917151111121119994555555115999999999990030421539
3142 0000009460000000946006072153993999242109999143
3143 9999999655555555555555555999999
3151 3749939191199663667454545177212121222111999999499559999999999999990010069249
3152 0000009460000000946003056523959999912999999159
3153 9999999655555555555555559999999
3161 4662031111222132667132445177421111222116714415111141 50020 5003444424171
3162 374721517164576517374711517214342762145115121
3163  6 7125555455555555555855215855
3171 25418331112211111571322351774211121222115643325411254 55014 8002342424172
3172 345442317137756517345443317213322722135113123
3173  6 7215655555755555655155225999
3181 4652021111221252536132543177421121222117742535232252 65012 6003114545172
3182 432663437245665517321678537144232632165515141
3183  210312655155455555655455245355
3191 6439919999999325177325144177621112211115445953232135 60015 8403889414172
3192 399951317104906653387951417145423762165112121
3193  3 7125555455455555215351245354
3201 346193111122223655712394517142112112211364252532234 1 4001599992033411112
3202 357431117136456117356431117214133462145313111
3203  6 712555599955555555555225855
3211 243232111113116275714153517751111111216633535434994 60014 2003322211172
3212 443332117124536317443232117212159642145112121
3213 99 99996557557555565655245355
3221 24525311111911171712244517761111112117415525423115 5001299993541314179
3222 999991437178816417369331437222253232165815123
3223  6 8999555655655555555655245355
3231 16316112112321335132423343773211112221165253252213 42 4751099993334415172
3232 344442517233656617344041551231254432164515111
3233  2 7125655755755555555155225855
3241 2341733111232341745222534177322121221217712525441133 400 5 1753334342171
3242 377830251133457517366930251221136422144615201
3243 10 312565575575555555555225354
3251 2431721111232122547123145177321111211117514545241231 07512 5002506315171
3252 36685151713454651736651517211155622165515201
3253  510123655755755555555455245354
3261 1741821211221153376344354177911112211116715155254134 5001212003695714171
3262 099791411237465417089691411141199652154449111
3263  4 712555555555555755855245354
3271 1241551211212556553335340377221222211216623142132322 45010 4253444322172
3272 486653217123236217455503251231299432165815111
3273 10 754865599999955855555245354
3281 14799312222222327211325211117922112222116615121121142 07523 1502353415372
3282 359541237138365517177941331212922432163112121
3283  4 7215655855755215859551 25355
3291 3749951111231253553145405177311112211117515345144431 50010 4003568215171
3292 467852537127615617456832537211273432164115111
3293  510123555557555554111152 45354
3301 5641631221232153465124054177221112211115744235341141 5501510003424322171
```

```
3302 393954217162746317393954317229999992992729202
3303  7 7125654355555555455455245354
3381 343182212212245455801424451773121111111177234353332 11 600 9 6303112212172
3382 32232121715911421730122125114432133214381 4122
3383 10 712365524585555555555245354
```

DATA CODE SHEET
LCC STUDY
(JULY 1976)

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
1	1-3*		--Respondent Number
	4		--Card Number (1)
	6	USECRF	--Length of Use of Current R-F 1 = 0-1 year 2 = 2-4 3 = 5-7 4 = 8-10 5 = 11-13 6 = 14-16 7 = 17 - greater
	7	BRANDN	--Brand Name 1 = Admiral 2 = Amana 3 = Frigidaire 4 = G.E. 5 = Hotpoint 6 = Sears 7 = Other 8 = Don't Know
	8	SIZRNG	--Size Range of Current Model 1 = 14 cu. ft. or less, sure 2 = 14 cu. ft. or less, not sure 3 = 15-18 cu. ft., sure 4 = 15-18 cu. ft., not sure

---

*Column 1 identifies the three treatment levels: 1 = LCC, 2 = energy/year, 3 = control.

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
1			5 = 19 cu. ft. or more, sure 6 = 19 cu. ft. or more, not sure
	9-10	XACTSZ	--Exact Size Estimate of Current R-F
	11	CONSIZ	--Confidence in Size Estimate 1 = Sure 2 = Somewhat Sure 3 = Not Sure At All
			--Features in Current Model 1 = Yes 2 = No 3 = Not Sure
	12	CURASH	Adjustable Shelves
	13	CURAIM	Automatic Ice Maker
	14	CURCOL	Color Other Than White
	15	CURFRF	Frost Free
	16	CURIAW	Ice & Water Dispenser
	17	CURPOW	Power Switch
	18	CURSSD	Side by Side Doors
			--Satisfaction With Each Model 1 = Very Unsatisfactory 2 = Unsatisfactory 3 = Somewhat Unsatisfactory 4 = Neither 5 = Somewhat Satisfactory 6 = Satisfactory 7 = Very Satisfactory
	19	SATEM1	Model 1

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
1	20	SATEM2	Model 2
	21	SATEM3	Model 3
	22	SATEM4	Model 4
	23	SATEM5	Model 5
	24	SATEM6	Model 6
			--Model Comparisons 1 = Worst to Buy 2 = Bad, But Not Worst 3 = O.K., Not Good or Bad 4 = Good, But Not Best 5 = Best of Six to Buy
	25	COMPM1	Model 1
	26	COMPM2	Model 2
	27	COMPM3	Model 3
	28	COMPM4	Model 4
	29	COMPM5	Model 5
	30	COMPM6	Model 6
	31	MSMODL	--Misunderstood The Model Task 1 = No Obvious Misunderstanding 2 = Sat. or Comp. was Misunderstood 3 = No Correlation Between Sat. and Comp. Tasks 4 = Complete Misunderstanding

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
1	32	INCSAT	--Completion of Satisfaction Scale 1 = Left One Out 2 = Left Two Out 3 = Left Three Out 4 = Left Four Out 5 = Left Five Out 6 = Left Six Out 7 = O.K.
	33	INCCOM	--Completion of Comparison Scale 1 = Left One Out 2 = Left Two Out 3 = Left Three Out 4 = Left Four Out 5 = Left Five Out 6 = Left Six Out 7 = O.K.
			--Building Task
	34	BLGSIZ	Size 1 = 14 cu. ft. 2 = 16 cu. ft. 3 = 17 cu. ft. 4 = 19 cu. ft. 5 = 22 cu. ft. 6 = 25 cu. ft.
	35	BLGFLO	Freezer Location 1 = Side by Side 2 = Top
	36	BLGCOL	Color 1 = Yellow, Avocado, etc. 2 = White
	37	BLGFRF	Frost 1 = Frost Free 2 = Manual
	38	BLGASH	Shelves 1 = Adjustable 2 = Nonadjustable

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
1	39	BLGAIM	Ice 1 = Automatic Ice Maker 2 = No Automatic Ice Maker
	40	BLGIAW	Dispenser 1 = Ice & Water Dispenser 2 = No Ice & Water Dispenser
	41	BLGEPK	Energy 1 = Energy Package 2 = No Energy Package
	42	BLGSER	Service 1 = Service Contract 2 = No Service Contract
	43	BLGROL	Rollers 1 = Mounted on Rollers 2 = Without Rollers
	44	MSBLDG	--Misunderstood The Building Task 1 = No Obvious Misunderstanding 2 = Misunderstood Mechanics 3 = Misunderstood Purpose
	45	BSTJGF	--Best Judgment of Features Certainty 1 = Very Uncertain 2 = Uncertain 3 = Somewhat Uncertain 4 = Neither 5 = Somewhat Certain 6 = Certain 7 = Very Certain

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
1	46	HLPCST	--Helpfulness of Cost Information 1 = Very Unhelpful 2 = Unhelpful 3 = Somewhat Unhelpful 4 = Neither 5 = Somewhat Helpful 6 = Helpful 7 = Very Helpful
	47	CMPLXC	--Complexity of Cost Information 1 = Very Simple 2 = Simple 3 = Somewhat Simple 4 = Neither 5 = Somewhat Complex 6 = Complex 7 = Very Complex
			--Feature Evaluation 1 = Dislike the Feature 2 = Don't Care If I Have or Not 3 = Good Feature 4 = Very Good Feature 5 = Like a Great Deal, a must
	48	EVLASH	Adjustable Shelves
	49	EVLAIM	Automatic Ice Maker
	50	EVLEPK	Energy Package
	51	EVLFRF	Frost Free
	52	EVLIAW	Ice & Water Dispenser
	53	EVLSER	Service Contract
	54	EVLSSD	Side by Side Doors
	55	EVL16C	16 cu. ft.

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
1	56	EVL19C	19 cu. ft.
	57	EVL22C	22 cu. ft.
	58-61	PEROWN	--Perceptions of Cost to Own a R-F
	62-63	PERLIF	--Perceptions of R-F Useful Life
	64-67	PEROPR	--Perceptions of Operating Cost of a R-F
			--LCC of Features 1 = $200 - $100 saved 2 = 99 - 0 saved 3 = 1 - 125 4 = 126 - 225 5 = 226 - 325 6 = 326 - 425 7 = 426 - 525 8 = 526 - 625 9 = 626 - greater
	68	LCCASH	Adjustable Shelves
	69	LCCAIM	Automatic Ice Maker
	70	LCCFRF	Frost Free
	71	LCCIAW	Ice & Water Dispenser
	72	LCCSSD	Side by Side Doors
	73	LCCEPK	Energy Package
	74	LCCSUR	--Sureness of LCC Feature Recognition 1 = Very Unsure 2 = Unsure 3 = Slightly Unsure 4 = Neither 5 = Slightly Sure 6 = Sure 7 = Very Sure

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
1	75	MSLCCR	--Misunderstood LCC Recognition Task 1 = No Obvious Misunderstanding 2 = Response Set Shows No Indication of Objective Judgment on Cost 3 = Lack of Correlation Between Responses To Different Costs 4 = No Response 5 = Partial Response - consistent 6 = Partial Response - Inconsistent 7 = Confused by scales 8 = Not Sure
	76	INCLCC	--Completion of LCC Recognition Scale 1 = One Missing Value 2 = Two Missing Values 3 = Three Missing Values 4 = Four Missing Values 5 = Five Missing Values 6 = Six Missing Values 7 = No Missing Values
	77	CSTLIF	--Which Cost More Over the Life of a R-F 1 = Electricity 2 = Purchase Price
2	1-3		--Respondent Number
	4		--Card Number (2)

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
2			--Life Time Energy Cost of Features 1 = \$300 - \$200 saved 2 = 199 - 100 saved 3 = 99 - 0 saved 4 = 1 - 50 5 = 51 - 100 6 = 101 - 200 7 = 201 - 300 8 = 301 - 400 9 = 401 - greater
	6	LTEASH	Adjustable Shelves
	7	LTEAIM	Automatic Ice Maker
	8	LTEFRF	Frost Free
	9	LTEIAW	Ice & Water Dispenser
	10	LTESSD	Side by Side Doors
	11	LTEEPK	Energy Package
	12	LTESUR	--Sureness of Life Time Energy Recognition (Same as col. 74, Card 1)
	13	MSLTER	--Misunderstood Life Time Energy Recognition (Same as col. 75, Card 1)
	14	INCLTE	--Completion of LTE Recognition Scale (Same as col. 76, Card 1)
			--Price of Features 1 = \$0 - \$25 2 = 26 - 50 3 = 51 - 75 4 = 76 - 100 5 = 101 - 120 6 = 121 - 140

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
2			7 = 141 - 160 8 = 161 - 180 9 = 181 - greater
	15	PRIASH	Adjustable Shelves
	16	PRIAIM	Automatic Ice Maker
	17	PRIFRF	Frost Free
	18	PRIIAW	Ice & Water Dispenser
	19	PRISSD	Side by Side Doors
	20	PRIEPK	Energy Package
	21	PRISUR	--Sureness of Price Recognition Task (Same as col. 74, Card 1)
	22	MSPRIR	--Misunderstood Price Recognition Task (Same as col. 75, Card 1)
	23	INCPRI	--Completion of PRI Recognition Scale (Same scale as col. 76, Card 1)
			--Yearly Energy Cost Recognition 1 = $20 - 15 saved 2 = 14 - 10 saved 3 = 9 - 0 saved 4 = 1 - 5 5 = 6 - 10 6 = 11 - 20 7 = 21 - 30 8 = 31 - 40 9 = 41 - greater
	24	YECASH	Adjustable Shelves
	25	YECAIM	Automatic Ice Maker

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
2	26	YECFRF	Frost Free
	27	YECIAW	Ice & Water Dispenser
	28	YECSSD	Side by Side Doors
	29	YECEPK	Energy Package
	30	YECSUR	--Sureness of Yearly Energy Cost Recognition (Same scale as col. 74, Card 1)
	31	MSYECR	--Misunderstood Yearly Energy Cost Recognition Task (Same as col. 75, Card 1)
	32	INCYEC	--Completion of YEC Recognition Scale (Same scale as col. 76, Card 1)
	33	ADVICE	--Consumer Advice on Which Model Costs the Least 1 = Exclusive 2 = Top Flight
	34	ADVCSV	--How Much is Saved by Purchasing One of the Above Two Models (i.e., Exclusive or Top Flight) 1 = Correct Answer ($34) 2 = Over Estimate 3 = Under Estimate 4 = Wrong Model 5 = Verbal Response, Correct
	35	TMRFPR	--Length of Time Since R-F Has Been Purchased 1 = 0 - 1 year 2 = 2 - 4 3 = 5 - 7 4 = 8 - 10

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
2			5 = 11 - 13 6 = 14 - 16 7 = 17 - more
	36	TMMAPR	--Length of Time Since Other Major Appliance Was Purchased (Same scale as col. 35, Card 2)
	37	NXRFPR	--Length of Time Before Next Purchase of R-F (Same scale as col. 35, Card 2)
	38	NXMAPR	--Length of Time Before Next Major Appliance Purchase (Same scale as col. 35, Card 2)
	39	SHPTIM	--Length of Shopping Time 1 = None 2 = Much Less Than Average 3 = Slightly Less Than Average 4 = Average 5 = Slightly More Than Average 6 = Much More Than Average 7 = Extensively
	40	AGEOLD	--Age 1 = 18 - 22 years 2 = 23 - 28 3 = 29 - 33 4 = 34 - 38 5 = 39 - 44 6 = 45 - 55 7 = 55 - 65 8 = 66 - over
	41	SEXMOF	--Sex 1 = Male 2 = Female

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
2	42-43	SCHOOL	--Last Year of School Completed
	44	HHEARN	--Household Earnings 1 = 0 - $4,999 2 = 5,000 - 9,999 3 = 10,000 - 14,999 4 = 15,000 - 19,999 5 = 20,000 - above
	45	JOBSBJ	--Occupation of Subject 1 = Housewife 2 = Management or Professional 3 = Sales 4 = Student 5 = Education 6 = Nurse 7 = Secretarial 8 = Other
	46	MARITL	--Marital Status 1 = Married 2 = Single 3 = Widowed 4 = Divorced 5 = Separated
	47	JOBSPS	--If Married, Spouse's Occupation (Same scale as col. 45, Card 2)
	48	CHLDRN	--Do They Have Children 1 = Yes 2 = No
	49	NMCHLD	--Number of Children at Home 0 = Zero 1 = One 2 = Two 3 = Three 4 = Four 5 = Five 6 = Six 7 = Seven 8 = More than seven

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
2	50	EINFOR	--Most Helpful Representation of Energy Information 1 = Cost Per Year 2 = LCC 3 = Neither 4 = Both One and Two
3	1-3		--Respondent Number
	4		--Card Number (3)
	6-7	OTHER1	--Additional Building Information Subject Would Liked to Have Received 1 = Energy Related 2 = Service Related 3 = Energy and Service Related 4 = Expansion of Available Information 5 = Non Energy and Service Related 6 = Specific Information on EPK 7 = Brand Name 8 = Building Material 9 = Other 10 = None
	8-9	OPERAT	--Main Factors Involved In Operating a R-F 1 = Energy 2 = Service 3 = Features Associated with Energy 4 = Features Associated with Service 5 = Others (Family, Climate, etc.) 6 = Don't Know 7 = 1 and 2 8 = 1 and 5 9 = 2 and 5 10 = 1, 2, and 5

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
3	10	ENRANK	--Rank of Energy in Importance 1 = 1st 2 = 2nd 3 = 3rd or lower 4 = Only One 5 = Not Listed
	11	SRANK	--Rank of Service in Importance (Same as col. 10, Card 3)
	12	OTRANK	--Rank of Others in Importance (Same as col. 10, Card 3)
	13	CNSIZE	--Major Consideration in Choosing Size 1 = Price 2 = Energy 3 = Service 4 = General Cost 5 = Convenience 6 = Family 7 = Style 8 = Don't Care About It
	14	ENRSIZ	--Influence of Energy on Choosing Size 1 = Yes It Was A Factor - Didn't Choose Because of It 2 = Yes It Was A Factor - Chose Due to Convenience 3 = Yes It Was A Factor - Chose Due to Family 4 = Yes It Was A Factor - Chose Due to Savings Gained 5 = No It Was Not A Factor

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
3			6 = Part of General Cost
	15	SERSIZ	--Influence of Service on Choosing Size (Same as col. 14, Card 3)
	16	CONSBS	--Major Consideration for Side/Side Doors (Same as col. 13, Card 3)
	17	ENRSBS	--Influence of Energy on Side/Side Doors (Same as col. 14, Card 3)
	18	SERSBS	--Influence of Service on Side/Side Doors (Same as col. 14, Card 3)
	19	CONTOP	--Major Consideration for Top Freezer (Same as col. 13, Card 3)
	20	ENRTOP	--Influence of Energy on Top Freezer (Same as col. 14, Card 3)
	21	SERTOP	--Influence of Service on Top Freezer (Same as col. 14, Card 3)
	22	CONFRF	--Major Consideration for Frost Free (Same as col. 13, Card 3)
	23	ENRFRF	--Influence of Energy on Frost Free (Same as col. 14, Card 3)

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
3	24	SERFRF	--Influence of Service on Frost Free (Same as col. 14, Card 3)
	25	CONAIM	--Major Consideration for Automatic Ice Maker (Same as col. 13, Card 3)
	26	ENRAIM	--Influence of Energy on Automatic Ice Maker (Same as col. 14, Card 3)
	27	SERAIM	--Influence of Service on Automatic Ice Maker (Same as col. 14, Card 3)
	28	CONIAW	--Major Consideration for Ice and Water Dispenser (Same as col. 13, Card 3)
	29	ENRIAW	--Influence of Energy on Ice and Water Dispenser (Same as col. 14, Card 3)
	30	SERIAW	--Influence of Service on Ice and Water Dispenser (Same as col. 14, Card 3)
	31	CONEPK	--Major Consideration for Energy Package (Same as col. 13, Card 3)
	32	ENREPK	--Influence of Energy on Energy Package (Same as col. 14, Card 3)

CARD	COLUMN	VARIABLE NAME	DESCRIPTION OF ENTRY
3	33	SEREPK	--Influence of Service on Energy Package (Same as col. 14, Card 3)
	34	CONSER	--Major Consideration for Service Contract (Same as col. 13, Card 3)
	35	ENRSER	--Influence of Energy on Service Contract (Same as col. 14, Card 3)
	36	SERSER	--Influence of Service on Service Contract (Same as col. 14, Card 3)

NOTE: Non-response and improper replies are coded as follows:

Card 1:
9: 6-8, 11-57, 74-77
99: 9-10, 62-63
9999: 58-61, 64-67
0: 68-73

Card 2:
0: 6-11, 15-20, 24-29
9: 12-14, 21-23, 30-41, 44-50
99: 42-43

Card 3:
9: 10-36
99: 6-7, 8-9

BIBLIOGRAPHY

Adler, Lee and James D. Hlavacek. "The Relationship Between Price and Repair Service for Consumer Durables," Journal of Marketing, 40 (April 1976), 80-82.

Asam, Edward H. and Lous P. Bucklin. "Nutrition Labeling for Canned Goods: A Study of Consumer Response," Journal of Marketing, 37 (April 1973), 32-37.

Axelrod, Myril D. "The Dynamics of the Group Interview, in Beverlee Anderson, ed., Advances in Consumer Research, 1976, 327-441.

Brandt, William K. and George S. Day. "Decision Processes for Major Durables: An Empirical View," Combined Proceedings of the Spring and Fall Conference, American Marketing Association, 1971, 381-388.

Brandt, William, George S. Day, and Terry Deutscher. "Information Disclosure and Consumer Credit Knowledge: A Longitudinal Analysis," Journal of Consumer Affairs, 9 (Summer 1975), 15-32.

Bruning, James L. and B. L. Kintz. Computational Handbook of Statistics. Glenview, Illinois: Scott-Foresman, 1968.

Bymers, Gwen. "Seller-Buyer Communication: Point of View of a Family Economist," Journal of Home Economics (February 1972), 59-63.

Campbell, Donald T. and Julian C. Stanley. Experimental and Quasi-Experimental Designs for Research. Chicago: Rand McNally Publishing Co., 1963.

Chaffee, Steven H. and Jack M. McLeod. "Consumer Decision and Information Use, in Scott Ward and Thomas S. Robson, eds., Consumer Behavior: Theoretical Sources. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1973.

Chestnut, Robert W. "The Impact of Energy Efficiency Rating Selective vs. Elaborative Encoding," Purdue Papers in Consumer Psychology, working paper no. 160, 1976.

Cohen, S. E. "Move on for Performance Standards," Advertising Age, 46 (October 20, 1975), 14.

Day, George S. "Assessing the Effects of Information Disclosure Requirements," Journal of Marketing, 40 (April 1976), 42-52.

Dommermuth, W. P. "Shopping Matrix and Marketing Strategy, Journal of Marketing Research, 2 (May 1965), 128-132.

Dupont, Thomas D. "Exploratory Group Interviews in Consumer Research: A Case Example," in Beverlee Anderson, ed., Advances in Consumer Research, 1976, 43-1433.

Engle, James F., David T. Kollat, and Roger D. Blackwell. Consumer Behavior. 2nd ed., New York: Holt, Rinehart and Winston, Inc., 1973.

Ferber, R. "Factors Influencing Durable Goods Purchases, in L. H. Clark, ed., Consumer Behavior. New York: New York University Press, 1955.

French, Warren A. and Hiram C. Barksdale. "Food Labeling Regulations: Efforts Toward Full Disclosure," Journal of Marketing, 38 (July 1974), 14-19.

French, Warren A. and Leila O. Schroeder. "Package Information Legislation: Trends and Viewpoints," MSU Business Topics, 20 (Summer 1972), 39-44.

Gatewood, Robert D. and Robert Perloff. "An Experimental Investigation of Three Methods of Providing Weight and Price Information to Consumers," Journal of Applied Psychology, 57 (February 1973), 81-85.

Granbois, Donald H. "Decision Processes for Major Durable Goods," in Nelson N. Foote, ed., Household Decision-Making. New York: New York University Press, 1961.

Guilford, J. P. Fundamental Statistics in Psychology and Education. New York: McGraw-Hill, 1956.

Haas, Jane W. and Ronald W. Rogers. "Coping with the Energy Crisis: Effects of Fear Appeals Upon Attitudes Toward Energy Consumption," Journal of Applied Psychology, 60 (December 1975), 754-756.

Hempel, D. J. "An Experimental Study of the Effects of Information on Consumer Product Evaluation," in R. M. Haas, ed., Science, Technology, and Marketing. Chicago: American Marketing Association, 1966, 589-597.

Henion, R. E. "The Effect of Ecologically Relevant Information on Detergent Sales," Journal of Marketing Research, 9 (February 1972), 10-14

Houston, Michael J. "The Effect of Unit Pricing on Choices of Brand Size in Economic Shopping Behavior," Journal of Marketing, 36 (July 1972), 51-54.

Howard, John A. "Conceptualizing Adequacy of Information," Proceedings, 3rd Annual Conference, Association for Consumer Research, 1972, 96-100.

Isakson, Hans R. and Alex R. Maurizi. "The Consumer Economics of Unit Pricing," Journal of Marketing Research, 10 (August 1973), 227-285.

Jacoby, Jacob. "Consumer Reaction to Information Displays: Packaging and Advertising," in S. F. Divita, ed., Advertising and Public Interest. Chicago: American Marketing Association, 1974, 101-118.

Jacoby, Jacob, Carol A. Kohn, and Donald E. Speller. "Time Spent Acquiring Product Information as a Function of Information Load and Organization," Proceedings, 81st Annual Conference, American Psychological Association, 1973.

Jacoby, Jacob, Donald E. Speller, and Carol A. K. Berning. "More Happiness: Constructive Criticism and Programmatic Research, Round Two," Purdue Papers in Consumer Psychology, working paper no. 145, 1974.

Jacoby, Jacob, Donald E. Speller, and Carol A. Kohn. "Brand Choice Behavior as a Function of Information Load," Journal of Marketing Research, 11 (February 1974a), 63-69.

Jacoby, Jacob, Donald E. Speller, and Carol A. Kohn. "Brand Choice Behavior as a Function of Information Lead: Replication and Extension," Journal of Consumer Research, 1 (June 1974b), 33-42.

Jacoby, Jacob, D.E. Speller, and J. Busato-Schach. "Information Acquisition Behavior in Brand Choice Situations," Purdue Papers in Consumer Psychology, work paper no. 140, 1974.

Katona, A. "A Study of Purchase Decisions," in L. H. Clark, ed., Consumer Behavior: The Dynamics of Consumer Reaction. New York: New York University Press, 1966.

Kirk, Roger E. Experimental Design: Procedures for the Behavioral Sciences. Belmont, California: Brooks/Cole Publishing Company, 1968.

Kotler, Philip. Marketing Management: Analysis, Planning, and Control. 2nd ed., Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1972.

Lavidge, Robert J. and Gary Steiner. "A Model for Predictive Measurements of Advertising Effectiveness," Journal of Marketing, 25 (October 1961), 59-62.

Lenahan, R. J., J. A. Thomas, D. A. Taylor, D. L. Call, and D. I. Padborg. "Consumer Reaction to Nutritional Labels on Food Production," Journal of Consumer Affairs, 7 (Summer 1973), 1-13.

Markin, Rom J., Jr. Consumer Behavior: A Cognitive Orientation. New York: Macmillan Publishing Co., Inc., 1974.

Mason, J. B. and S. H. Himes, Jr. "An Exploratory Behavioral and Socioeconomic Profile of Consumer Action About Dissatisfaction with Selected Household Appliances," Journal of Consumer Affairs, 7 (Winter 1973), 121-127.

McCall, Robert B. and Appelbaum, Mark I. "Bias in the Analysis of Repeated Measures Designs: Some Alternative Approaches," Child Development, 44 (1973), 401-415.

McGuire, B. J. and E. A. Vadelund. Voluntary Labeling Program for Household Appliances and Equipment to Effect Energy Consumption: Annual Report for Calendar Year 1974, Center for Consumer Technology, Institute for Applied Technology, National Bureau of Standards, Washington, D.C., February, 1975.

Mendenhall, William. Introduction to Probability and Statistics. 3rd ed., Belmont, California: Duxbury, Press, 1971.

The M.I.T. Report: Consumer Appliances, The Real Cost. RAND Document Center, National Science Foundation, Washington, D.C., 1974.

Mittelstaedt, R. A. "Consumer Protection and the Value of Information," Proceedings, 3rd Annual Conference, Association for Consumer Research, 1972, 101-106.

Monroe, Kent B. and Peter J. LaPlaca. "What Are the Benefits of Unit Pricing?", Journal of Marketing, 36 (July 1972), 16-22.

Newman, Joseph W. and Richard Staelin. "Prepurchase Information Seeking for New Cars and Major Household Appliances," Journal of Marketing Research, 9 (August 1972), 249-257.

Nourse, Robert E. M. and C. Dennis Anderson. "The Effect of Information Labeling on a Consumer Durable Purchase," Proceedings, Fall Conference, American Marketing Association, Washington, D.C., 1973, 278-282.

Payne, Melanie. "Preparing for Group Interviews," in Beverlee Anderson, ed., Advances in Consumer Research, 1976, 434-436.

Rogers, Everett M. Diffusion of Innovations. New York: The Free Press, 1962.

Ross, Ivan. "Applications of Consumer Information to Public Policy Decisions," University of Minnesota, working paper no. 7, November 1972.

Russo, J. Edward, Gene Krieser, and Salley Miyashita. "An Effective Display of Unit Price Information," Journal of Marketing, 39 (April 1975), 11-19.

Scitovsky, T. "Ignorance as a Source of Oligopoly Power," American Economic Review, 40 (May 1950), 48-53.

Smith, S. A. "How Do Consumers Choose Between Buyers of Durable Goods," Journal of Retailing (Summer 1970), 18-26.

Stokes, R. C. and R. Haddock. Interim Report of the First Two Phases of the CRI/FDA Nukihovial Labeling Research Program, Consumer Research Institute, 1972.

Strong, E. K. The Psychology of Selling. New York: McGraw-Hill Book Co., 1925.

Swan, John. "Experimental Analysis of Predecision Information Seeking," Journal of Marketing Research, 6 (May 1969), 192-197.

Swan, John. The Energy Policy and Conservation Act, Public Law 94-163.

__________. The Productivity of Servicing Consumer Durable Products, The Center for Policy Alternatives, Massachusetts Institute of Technology (M.I.T.) with Charles Stark Draper Laboratory, Inc., Report no. CPA-74-4, 1974.

Thorelli, Hans B. "Concentration of Information Power Among Consumers," Journal of Marketing Research, 8 (November 1971), 427-432.

Walker, O. C., R. F. Sauter, and N. M. Ford. "Potential Secondary Effects of Consumer Legislation: A Conceptual Framework," Journal of Consumer Affairs, 8 (Winter 1974), 144-155.

Wilkie, William L. "How Consumers Use Product Information," Report Prepared for National Science Foundations, Grant no. GI-42037, Washington, D.C.: Government Printing Office, 1975a.

Wilkie, William L. "Consumer Information Processing Product Labeling," working paper series, Marketing Science Institute, 1975b.

Winer, B. J. Statistical Principles in Experimental Design. 2nd ed.,New York: McGraw-Hill, 1971.

BIOGRAPHICAL SKETCH

The author is currently employed at the University of Denver as an Assistant Professor in marketing. Past teaching experience includes a graduate teaching assistantship at the University of Florida (summer 1975) and a position as an Instructor at Southeast Missouri State University (1971-1973). Teaching and research interests include the application of consumer behavior theory to public policy and marketing management problems.

A B.S. (1970) and an M.B.A. (1971) were obtained at Oklahoma State University. A Doctor of Philosophy in business administration was earned from the University of Florida (1977) with a major in marketing and minors in social psychology and research methodology.

Professional affiliations include membership in the American Marketing Association, Association for Consumer Research, Alpha Kappa Psi, Beta Gamma Sigma, and Phi Eta Sigma. Recent awards include the AMA Doctoral Consortium Representative (1975) and an AMA Doctoral Research Grant (1976).

The author was born August 6, 1947, and is married to Linda A. Nolen. Interests include tennis, golf, skiing, and reading.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

William L. Wilkie

William L. Wilkie, Chairman
Associate Professor of Marketing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Joel B Co

Joel B. Cohen
Professor of Marketing

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Grace G. Henderson

Grace G. Henderson
Assistant Professor of Sociology

This dissertation was submitted to the Graduate Faculty of the Department of Marketing in the College of Business Administration and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

March, 1977

Dean, Graduate School

UNIVERSITY OF FLORIDA
3 1262 08554 1182